MASTER IN COMPUTER SCIENCE

About dynamic interfaces today

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ERRATA.

PAGE 3 : the sentence "...more of them gives a practical ..." should be readed as "...most of them gives no practical ..." at third paragraph,fourth line.

PAGE 9 : the word "buger" should be readed as "buyer" at paragraph III.4.5,the last word.

PAGE I2 :the two words "on" should be readed as "or" in the fourth line from the end of the page.

PAGE 20 :the sentence"$\exists i : I \leq i \leq m : T_i = T_i'$" should be readed as "$\exists i : I \leq i \leq m : T_i \neq T_i'$ " in the third line.

PAGE 46 :the word "bathone" should be readed as "bottom" in the sixth line and in the eleventh line.

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Part 1 : INTRODUCTION

"Software is a means, not an end."

I . Origine of the work.

My starting point was the fact that I enjoy working at Operating System level and then, most of the time, the language used is the Assembler language . The environment I use to deal with is often a work for large and complex software and not for a software created only for beeing used during a few days.

It means also that practical ideas are, for me, more valuable than theoretical ones because many times you see very nice theoretical ideas without any practical consequences (at least at the time of the publication). It is not said that you do not have any part of a practical work which will not deal with modelization or underlying theories.

During my practical work, wich was carried out in Assembler language, I saw many things I thought to be practice of the 50's at no more living! (as some as theachers told us). Most of the programs were not documented. Even worse, programs with comments, but these comments were not updated when the code had to be, are very difficult to understand. Another problem was coming from the fact of compatibility.

I . 1 . Assembler way of work.

I had had to write a few new functions for an existing software. In doing this, I had to deal with many problems due to the fact that I was obliged to extract the coding from existing programs in order to insert them in mine . It is a good idea not to rewrite existing coding but not in this way . Moreover, if some other people is working on the program from which you are extracting some coding . This is because of compatibility between different versions of the software to be supported.

Another problem are to me, in Assembler you can change the expression of a macro without having to rename it . Then, whenever you are assemblying a program, you only need to have to say with which module libray it needs to be done . And the macro can have been change without having

to change something in the Assembler program.

As the current evolution is to do operating system in a higher level language and as it is stated before, I was interested to see if this mechanism of different macro expension can or exist in higher level language as C, Pascal or ADA.

I . 2 . High-Level languages way of work.

I started than to see if higher level languages support facilities liter different number of parameter in a parameter list, passing unbounded arrays, and so on . That can be done in Assembler, but is it possible to handle "DYNAMICAL INTERFACE" in higher level languages ?

As C was a language of an existing operating system, I looked first to it . The estonishment was that there are no checking of the correspondances between formal and actual parameters . Indeed, the caller puts its parameters in a stack; the caller takes wath it supposes to find and as return the caller keeps its parameters out of the stack but no checking is done . After this, I looked to Pascal because it was presented as a good language . In this language, there is no possibility to do it because no external compilation is possible (In its standard form at least). In Ada, the type checking between formal and actual parameters is done but once an interface has to be changed we must recompile and relink to whole software . Than, the check is done but without possibility of dynamic interfaces .

I . 3 . Some remarks.

In the following text, I will often used the term "strongly typed languages" . This means that objects of a given type may take only those values that are appropriate to the type definition and, in addition, the only operations that may be applied to an object are those that are defined for its type . I will refer to this to distinguish languages like Fortran, Cobol, PL/1... where there are no type checking and to those like Pascal and Ada where check is done.

I . 4 . Basis of my decision.

From now, it is from that point that I started to thing that the dynamic interface would be an interesting point to study . During my practice, I met Mister Linder who told me this problem and explained me that if this was resolved, then will be easier to work and easier to handle different version of software.

Another basic fact is that most bugs are localized in very few places in the code, than if this code would be replaced easily by a new version even if the interface has been changed . It whas the problem when it is a faulty module in an operating system . It would be easy if the only thing to do was when maintainance operation replace the module without having to recompile or to relink the whole .

I started than, to read many books or articles about software management, software debugging, software testing and software engineering . Quite all these books mention the interfacing problem but more of them gives a practical solution if they give any . Most of the time you can read sentences like this :"The problem lies in the interface, but this problem is behind the scope of this book." And no more explainations are given.

Once started to deal with the problem, I saw that there was a problem with compile implications as well as operating system ones . For instance, in Ada, the compilator does the check but for doing it, it needs to have a Data Base where all informations about each programs are putted in . What this means is that we must have a Data Base management system associated with it.

My point of view is to find solutions such that these solutions are practical . That means that the solutions do not need to much spaces; loose to much efficiency; be too expensive and should be easy to handle.

I . 5 . Presentation of the structure of this publication.

The next chapter will give an overview of what is the environment in which this work was undertaken and first a brief historical review. After this, a formal definition will be given and from this definition I will see its connection with the three mainly costly activities :

Maintainance, Debugging and Testing . All this is seen as means in order to increase software quality and also in order to see wath parts of them are concerned with the solving of the dynamic interface problem. All these will arrive to the conclusion of wath are the advantages in solving the problem and also to the possible theoretical solution which in turns will arrive to some implemented solution . All this with comments and critics because none of the solutions is ideal in all point of view .

II . A brief historical review .

II_._1_Introduction.

This is done in order to see what is the evolution of the software problems encountered during a few decade from the 50's to the 80's . These sentences give only the symptoms of the most troublesome problems. If a sentence is written more than once, it is because this problem was not solved or because of the evolution of the complexity of software activities the problem is once again there.

II_._2_._Presentation.

In the 1950's :
- -Programming in machin language
- -The inefficient Assembler
- -A software tool for hardware designers
- -The disappearing programs

in the 1960's :
- -Fully tried and tested ?
- -The impossible error message
- -It works most of the time
- -If you can't fix the errors,ignore them
- -Can software failure bankrupt a company ?
- -Theory simplifies practice

in the 1970's :
- -An integrated collapse in the new world
- -An integrated collapse in the old world
- -Fully tried and tested ?(2)
- -Data base management systems : panacea, placebo or poisons ?
- -A system expands until it collapses
- -Keep trying until it works
- -The software development backlay
- -Theory predicts problems in practice
- -At the end of the decade, there are still collapsing
- -To collapse or not to collapse

in the 1980's :
- -An integrate collapse in the whole world
- -A computer works week is shorter than a human works week

-Can computer system push the button ?
-Keep trying until it works
-Software failure can bankrupt a company
-Software improvements ?
-Better late than never
-Where shall we get the teachers ?

II.3. Explainations.

These sentences are not given here in order to explicits all the development process of software evolution . It is also not an attempt to describe the evolution of software development process but there you can find the evolution of where the problem was and where is the main difference between these periods .

It also will serve me as reference on the reasons why I undertook this study and why I undertook it with the point of view I defined earlier .

III . Global context of today 's software development.

"Careful programming is not a trivial task, even with smart environment ."

III . 1 . Introduction.

This section is intented to give an overview of the global environment that is available today . It will also try to define why it is important or which problem is or are the most important one(s) . Then when the global context in which all software have to be developped is described, a more precise description of this work will be given.

In order to be able to give a precise description of the software state today, it seems to me that the next important things are to be kept in mind .

First, the fact that programming is a social activity, requiring negociation and communication . That is important because it can explain why there are many difficulties in dealing with programs . Indeed, if it was not the case you are only dealing with people of the same formation . Then the problem lies on the fact that when dealing with large software you are dealing with a multidisciplinary activity and no more only just with a computer activity .

Second, and related fact is the fact that any programmer needs to communicate in one language with the computer, and in another one with the user . And the problem is that the user uses its technical vocabulary . The problem is, than, the needs of a clear, concise and precise language . There is a problem of communication.

III . 2 . Software crisis .

There is a few years ago that the software crisis was recognized but it was only in the years 1968 in a NATO Conference that the software crisis was for the first time officially recognized. But this crisis was seen long before but was not analysed and no means were given in order to salve it . We must be honnest and must say that the crisis is still alive .

In order to see some solution, the best way is to see where come this crisis from and than, to see which were the actions or what were the constitutive elements of this crisis .

III . 3 . Origine of the software crisis .

From most readings, we can find five causes of the crisis :

1. There were (are ?) no cooperation between hardware designer teams and the people who are using it, the software designer teams . But, there is also no cooperation (at least not enough) between software designer teams and the users of the software. .

2. As pointed out by Dijkstra,there is a problem with the compatibility that you must preserved even if these compatibility forces you to write bad quality software . It is not possible to write good software if you have to be compatible with bad one .

3. The software crisis is the result of an human limitations in dealing with complexity .

4. Most people who are working on software, do neither understand fully what they are doing, nor the means they use nor the user's needs . For instance, many people I met were not educated in order to be able to write good software, many of them were mathematicians, biologist, and so on . I do not want to say that none of them are good but that there is a problem to find good trained people . For more details about it see the book of "Software Reflected".

5. There is a very large distance (too large !) between the state of art and the state of practice . That is a very crucial point. Indeed, how will you that software quality will be improved if there exist no theory or no theory experimented on a large scale practical projects . I think that there is no mather where this occured but it is not enough recognized . I do not know any other domain where pratician are so negative in front of the theoretist . One could think that the reason why this occurs is the fact that many people believe that the cristicism of a theorician is the cristicism of this own person or work . And here is the place to advocate the need of egaless programming at any level of software development .

Let us seen what are the symptoms of the crisis.

III . 4 . Symptoms of software crisis .

One can hape that if one was able to see the symptoms, may be, can he (she) be able to see the real cause of this bad effect . The next points are perhaps not all symptoms but the most of them .

III . 4 . 1 . Responsiveness .

Too often, computer based systems do not meet user's needs . This should come from the fact that the user was not able to define precisely what were this needs or this should come from the fact that the communication between users and designers was not correct enough . The consequences is that most systems meet not exactly what the user expected it to be .

III . 4 . 2 . Reliability.

Too often, software fails . This do not say that the software was not done but not done completely or not in time . For more details see the book of F. Brooks : "The Mythical Man-Month".

III . 4 . 3 Cost .

Too often, the established cost of the software is not respected . The software costs are seldom predicable and are perceived as excessive. This is a well known fact . This include direct and indirect costs .

III . 4 . 4 . Modifiability.

It is well known that maintainance is a very heavy activity which cost quite 80% of all programmers activities . Maintainance is also complex, costly and error prone . Some time, if you need to modify you are better in rewritting it entirely . For more details, see the corresponding chapter in this publication .

III . 4 . 5 . Timeless .

Software is often delivered with unexpected delays and with less than promised capability . This is very strange that this is quite the only discipline where this is done without reaction from the part of the buger .

III . 4 . 6 . Transportability .

Software written for one system is seldom usable in another one without having to change a lot . Even some time, it is better to rewrite the whole because not all systems have all programming languages.

III . 4 . 7 . Efficiency .

Software development efforts do not make optimal use of the ressources involved .

III . 5 . Basis of intended solution .

Once it was seen that both old and new software both suffer from the same symptoms . From this constatation, some people began to work on this problem . Few people were working on theoretical point of view while others were working on practical issues . One of these results where the establishment of the "Laws of program evolution". These laws were established for large and medium sized software . This means that the software will be in use during a period of at least several month and also in use for several people .

III . 5 . 1 . Law of continuing changes .

This law says that a system that undergoes continuing changes until it is juged more cost effective to freeze and recreate it . Indeed, change can be required by many things among them we can mention: environment changes, user's requirements change, error correction, ...

III . 5 . 2 . Law of increasing entropy .

The entropy of a system (its unstructurness) increases with time, unless specific work is executed to maintain or reduce it . In fact, whenever there is an error correction, there are more chances of introducing other errors . That is because more often the people correcting the software is not the people who has designed it and because there is no documentation precise enough (and updated !) in order to let you understand all interactions between all parts of software (I should tell you one of my experiences . I had to add some new functions in a software . In order to do it as best I could, I asked for documentation of the whole software (and its history) . What was my surprise when I heard the following response : "There was soo much documents, and none knows yet what are the papers in it . Then no one use it . So, as we have no much space and as we need more space, we put all the documentation in the dustbin .) This is an exemple but I think that this kind of story are not so rare even if it occurs for another reason

III . 5 . 3 . Law of statistically smoothgrow .

Growth trends measure of global system attributes may appear to be stochastic locally but statistically they are cyclically self regulating with well defined ranges .

III . 6 . Some other comments .

Before going further, I would like to put here other sentences quite like proverbs about software . The reason why I put them here is that they are important in order to introduce a definition of a new discipline (some people do not agree with the fact that this is a discipline) . This new discipline is commonly named software engineering . The creation of this discipline can be seen as a response to the software crisis . This response should provide solutions to the software crisis or at least to reduce the bad effects of the crisis . These proverbs refer to the invisible part of software :

-There is NO one right set of statements to realize a software
-Software is abstract and therefore difficult to deal with (no exemples are possible)
-Large software cannot be completely error free, even after years of use
-Systems requirements cannot even be fully stated in advances, not even in principle because the user don't know them in advance not even in principle .

Some people say it another way : "A bug free program is an abstract theoretical concept."

What has been said until now seems to drive you to the conclusion that there is nothing to do again the software crisis, but that is not the goal of this . The goal of these lines about is to prevent us to talk too easily of correct programs without knowing that that is a theorical view . It is time now, I will try to give a definition of what is software engineering, on what is software engineering based and what are today results of this discipline . First of all, we have to see that this discipline has the aim of finding a response to the crisis .

III . 7 . Software engineering as solution .

As there is no established definition, I will keep the next one as the accepted one.

III . 7 . 1 . Definition .

Software engineering is a set of structured ways of performing traditionnal software development activities and a set of structured activities that are not part of the traditionnal software development process .

III . 7 . 2 . Some comments .

What is named traditionnal activities is the activities implied by the fact that some problem was to be solved by machines . But this was done without all the present ways of doing it . There was nothing as structured programming, top down programming, and so .

From this definition, we can conclude that software engineers will be able to give anyone tools and principles in order to increase quality software production . Yet, we have introduce a new concept : quality software . It is a beautifull word but how to establish what quality is when speaking about software . For this purpose, I have choosen the five most important (for me, there are no other) criteria in evaluating software quality which are modifiability - efficiency - reliability - understandability and correctness . These criterias are not easy to realize . Indeed, many times, if you choose to increase the modifiability as the most principle componant of your software quality, you will find that understandability and/on efficiency criteria are than no more respected . Let us examine more closely these five criteria .

III . 7 . 3 . Modifiability .

Refering to the law of continuing change, we can say that a software (except short-lived software) is always changing . These changes are due to a number kinds of facts . Among these kinds of facts, one should mention the following . The users change their requirements on the modelized computer world changes on the software environment changes . We know that all these changes occur many times during the complet life-cycle of a software . Many of these changes are not known when the software were designed and constructed . Then, in order

to create software with grat ability of changes, we can see that the idea of modularization of software . This is done in order to have to modify only one module instead of a few statements within all the software . But this has also lead to the problem of how to cut it in module and worse how to deal with interfaces changes? That is not solved even with language of the 86's as ADA .

III . 7 . 4 . Efficiency .

As software development becomes a more common practice, (that is the fact that software begins to cover many discipline) real-time software has become needed and also were interactive ones . This has as consequences a much more complex activity than having to deal with the old batch processing . Efficiency has changed from saving spaces because the first series of machines had no many space enough in order to deal with large software, to saving time because of the new systems(networks, teleprocessing, ...) are more time oriented the space saving . The problem now is to increase understandability of program without loosing good response time . All this should be done without having to write in low level languages (as Assembler) and with prescriving portability, readability and of course the facility of maintaining, testing and debugging this software . Some people say that efficiency is not a problem, I do not agree with that but it is right that efficiency does not have as consequences to loose other criteria .

III . 7 . 5 . Reliability .

This has two meanings: - The first one is the collection of all the techniques which can be used to designed and test the software so that it is relatively error free . Some people call these the techniques which apply to the design of reliable software .

- The second one is probability that a given software system operates for some time period without software errors, on the machine for which it was designed, given that it is in used within design limits (see for instance the IBM DOS/MUS, which normally does not crashed) Therefore we must defined what is a successful operation of the software what is in practice a non trivial task .

It is not possible to do verifications with traditionnal program construction . Now, when you construct your software at the same time you think the way which are possible to take in order to verify it .

But how to do it when none of the languages accept to have dynamic interfaces and few of them even accept static interface checks (the only one is ADA, because most Pascal compilers are standard in the sense that they accept external compilation but without any check !)

In order to ensure software reliability, you must ensure software debugging, testing and maintaining . And once more, you must deal with interface where the worse bugs are .

III . 7 . 6. Understandability .

The language are use as vehicule for expressing a solution must be easy to read and understand for both users and the concepters . In order to realize this some people has proposed to define a formal language in such away that both users and concepters can communicate together in a proper way without confusion or misunderstanding . This implies that one has to know a lot of these languages ...

Some other people see specifications as a means in order to meet this goal . Another way to realize this, is the use of comments and documentation . We define comments as not just paraphrazing what the code does but as explaining what it is intended to do .

In my experience (a short one but ...) this means that it is not good enough as solution if there is no pressure or not heavily enough in order to update them . Whenever I have to deal with assembly coding, I read first the comments in order to see first what it is attended to do before trying to see how it is done . But what was my surprise to see that the coding did not match the comments . When I saw this, I wanted to know why this occured . The response was that there was a lack of time . As we will see later, the lack of time is often a great ennemy of all software engineering effort . As mentioned before, this also occurs with documentation . These are the reasons why I see specification as this means .

III . 7 . 7 . Correctnes .

The starting point, here, is the fact that a software without bugs is a pure theoretical concept .In all practical example, you will never be able to establish that there are no more problem . Once again I can take the interfaces example, in the main program the variable was declared as real and in the subprogram they were declared as integer . Before execution time, there were no problem but at

execution time the results were not correct . During the testing period, this was not seen and how to ensure that can not occur ?

At testing period, you can never prove the absence of bugs, the only thing that you can prove is their presence . This of course is not a reason to stop trying means or stop researching a solution to decrease their numbers ! It is important to see how you can avoid some bad mistakes, how you can write software in such a way that it will easier to handle .

Another problem is to define precisely what correctness means . That also is not a trivial task . A most commonly accepted definition is that a software is said correct if it meets its specification . This as the next consequences :

First, this implies that you have to define what specification is, there is no commonly accepted definition . But supposing that this can be done .

Second, you should be able to prove that the software does exactly (no more but no less) what the specification tells you the software should do . Suppose that this can be done .

Third, you have to prove that the specifications describe exactly the expectation of the user . Because otherwise it is not usable and looses its interest . That, of course, is quite impossible because often the users do not know themselves what they need !

III . 8 . Some existing solutions .

In order to give solutions, some people have given ways to increase software quality but too often these solutions are partial solutions but are seen as Solutions . These methods are mainly : Structured programming - Top down design - Step wise refinement - Systematic testing - Inspection of code - Programmer team and a few others . These methods are be coming to be used in practice . But often they are not used or not completely used because they are time consuming and involves the training of people . In the next section, I will explain one of the most heavy pressure against their uses .

III . 9 . Reaction under Deadline Pressure .

The problem, here, is to deal with time . In all methods I know, this fact is never handled and even never mentioned . But deadline pressure is a fact of life in the real world of software development. It can never be eliminated so that methods without speaking of time are usefull only for theoretical purposes. But if we want to give an answer to it we must learn to live with it . If people see that they will not have finish in time what will they do ? There are four answers and I will briefly explain each one .

III . 9 . 1 . Eliminating the deadline .

This is the first answer, but I think that is never used because once an organisation has done a planification of its activities it is not easy to change them . Moreover, how to do it without giving the impression that you have done no work enough or that you are not "usefull" . Then, nor the programmer nor the manager will accept this solution .

III . 9 . 2 . Not Completing all the work .

This is not to realize all promised functions . But the problem is to deal with the reactions of the user . If you are a society, you can not be able to do it without loosing bugers.

III . 9 . 3 . Not completing software engineering purposes .

That is the easiest solution because no one can see if all software engineering steps were accomplished . The only time when this should be seen is when the software is yet in use and at this time it is no more possible to do anything else than to maintain it even this increasing cost of maintainance is greater than if another solution was choosen .

III . 9 . 4 . Increasing the software team productivity .

There are no many ways in doing it and it is not possible to do it many time . The first idea is to increase the number of people working on the project . But as explained in the book of F. Brooks, "The Mythical Man-Month", it is often worse to do this action than to accept the delay .

The second idea is to convince the staff to work harder but if they are working yet at their maximum it is not possible .

The third idea is to force the staff to work much more hours than usualy done . But this leads to two consequences:first there are extra hours that cost much more than a normal hour and that after short time they are tired and do not work more efficiently .

The last one is to acquire or develop tools that genuily increase productivity but this involves a loose of time (which is yet too short) if developping it and a loose of money and time if acquiring it (+ training).

III . 10 . Why is the reaction, reducing software engineering efforts the most commonly used ?

I think that there are mainly four reasons in doing so. First we should mention the fact that the benefits of software engineering efforts are delayed and diffused . There are no means for mesuring it precisely . Second, the decision can be made without knowing the consequences of this decision . If one has to inspect the coding but is late in his (her) own work, it is a normal reaction to first work on his (her) work before working for someone else . But this person should of course never say that he (she) has no readed it . Then it is suppose to be done with all consequences that are involved. Third, the software engineering efforts is not seen until the software is used for a certain period of time . It is only when maintaining or debugging that these efforts can be appreciated . And fourth, the system fails to reward people for this software engineering efforts . Too often what is heared is keep on schedule but quite never keep on quality is heared .

III . 11 . Some concluding remarks .

As seen, we can establish that there are three principal ways of increasing software quality : Testing it systematicly, debugging it whenever test has shown a bug but doing it carefully and maintaining which is much more error prone than creating new software . These of course are not independant each one from the others . They will be explained in the next part and their relation with my study will be explained .

Part 2 : Definition of the Problem and the Relations between the Problem and the Software Engineering Purposes

I . Definition of the problem .

I . 1 . An informal definition .

The problem under study is to find a mechanism which should permits to handle dynamic interface . The reasons of this need is that once operating system are created they evolue . For instance, if one model in an old version (but yet supported) has many bugs and if in a new version these where corrected, it should be great if one would be able to change the faulty one without having to recompile and relink the whole .

What has to be done ? First, it has to be able to do the type checking between two modules which are externally compiled (not compiled in the same compile unit) . This is now quite never done . Second, it has to be able to handle a permitted difference between two parameter list . Of course, it must be able to distinguish between an erroneous call and a correct call with a different number of parameter (or different types) .

I . 2 . A formal definition .

Formally the problem can be describe as follow (using a Pascal-like syntax)

```
proc Y (P1 : T1; ..... Pn : Tn) ;
        .
        .
        .
end Y;
```

and the new procedure Y' which is intended to replace Y in the software :

```
proc Y' (P'1 : T'1; ..... P'm : T'm);
        .
        .
        .
end Y';
```

It must be pointed out at this point that the new types T'_1 .... T'_m have to satisfy definite contraints if we want old calls throughout the software remain valid . For example, if we replace Add (X1 : real; X2 : real) by Add (X1 : int;X2 : int) without changing or recompiling the module containing the old call. The new module will add without any care the two machines words (implementation of 32 bits machine word for both types real and int is assumed) adding both mantissa and exponant leading obviously to an invalid result .

There are three possibilities.

I . 2 . 1 . m = n

In this case the type checking will return an O.K. if all $T_i = T'_i$ $\forall$ i : $1 \leq i \leq n$

This involves that a subrange is not seen as correct even if logically it would be possible to do it, but this add the problem of seeing a subrange of a type as the type it self for the checking purpose. The T_i and the types associated with the P_i which are the parameters . The type define the correct value than the parameter can taken .

I . 2 . 2 . m > n

1) $\forall$ i $1 \leq i \leq n$: $T_i = T'_i$

This constraint is added in order to avoid the problem stated in the example . For illustration let consider : Add (X1 real;X2 : real) to be replaced by Add (X1 : real;X2 : real;X3 : int) . It is obvious to see that it is not difficult to be sure that old call will continue to be valid .

2) $\exists$ i $1 \leq i \leq n$: $T_i \neq T'_i$

This is more complex to handle . Indeed, let take the example above : Add (X1 : real;X2 : real) to be replaced by Add (X1 : real;X2 : int; X3 : int). It is of course not so easy to see how to handle this with care in order to error that old call will remain valid . It is of course the responsability of the people who replace the software to be sure that they are compatible . It is of course not possible ever at operating system level to see if they are compatible or not .

I . 2 . 3 . m < n

1)$\forall$ i $1 \leq i \leq m$: $T_i = T'_i$

This is quite easy to handle when the m + 1, ... n parameters need no more to be used because, for example, the hardware have changed .

Of course, when it is not the case, the responsability of validating the old call is of the changer .

2) $\exists$ i $1 \leq i \leq m : T_i = T'_i$

This is not easy to handle, and , in all cases, the responsability of the people who introduces the new module is complete . No systems can be responsable of a problem of this kind of compatibility .

I . 3 . Some remarks .

Here the way to handle this problem is not important, but it is important to see exactly in what the problem consist and from this to see what are the necessary responses in order to find solutions .

As seen, all is not done only by the computer, there is quite always part of responsability of the user to respect the conditions in which this can be done .

Let us see now what are the relations between the solution of the study and the three main activities : Testing, Debugging and Maintaining .

II . Relation with Testing .

II_._1_._Introduction .

Why do I begin with testing ? Because, once you have finish to write something like specification, coding, ... you want to see if what you have done is correct before doing other thing or before you want to enter in deeper detail . For doing it, one of the more useful technic is testing it . But testing ? It is not an old technic ? Whenever you read a book about software, you will have the illusion of the no-necessity of program testing . In fact, in more or less all books, you will read that when you are written your system you have to write in the same time the correctness proof . Then if you are able to write the proof of the correctness of what you have done... Why should you test it ? And then you are reading written by some practician and you will discover that it is never possible to prove the total correctness of a system even an easy one . For more details see the book of Myer G. J. : "the Art of Software Testing" . In this book Myer writes : "Testing is the process of executing program(s) with the interest of finding errors starting with the Assemptor that the program(s) CONTAINS ERROR !" Said in another way : a bug free program is an abstract theoretical concept. From this point of view, a test case is successfull when finding a notyet discover error and not as in almost every day testing, the goal of test is to prove that than is no more bug . In fact, testing will NEVER prove the absence of bugs only can it prove their presence .

II_._2_._Definition .

Testing is one way (the other one is verification) of validation of software . Testing explores a large number of the possible exception historics of the system in order to fine as many not yet discovered error as possible . Therefore, one can define a good test case as one having high probability of detecting an as yet undiscovered error and a successfull test case as one detecting an as yet undiscovered error . Too often, when one is testing some part of software it is doing it with the idea to prove that the software tested is correct, instead to start with the idea that it is not .

II.3. In which context testing should be done ?

The first part of this is to see what is a test case or a good test case . A neccessary part of a test case is a definition of the expected output a result of this test case . Another part is the fact that a test case must be written for invalid and unexpected, as well as valid and expected, input conditions because examing a program to see if it does not do what it is supposed to do is only half of the battle . The other half is seeing wether the program does what it is not supposed to do . In other words, a test case has to establish that a program does what it is supposed to do but nothing more, if a program does more it is also an error . For these reasons, a program should never be tested by its programmer because too often, the programmer knows too much about his program and will not be able to create an effective test case because if he had already know what he test, he had already written the corresponding code . As modification of a program is error prove (more than writing a new one), we should never throw away test cases unless the total program have to be thrown away . Because after each modification we will have to retest all the software . An other principe should guide the decision of stopping testing the software estimating that no more error will be found with a acceptable economic price . This principe is the following; the probability of the existence of more error in a section of a program is proportional to the number of errors already found in that section . This can guide the decision of what test next . This principle is based upon a common experience of existing software when more or less 80% of bugs are in only 10% of code . Testing involves finding that an error exist not located it nor correct it, that is the role of debugging . Testing is also the only method for checking not the correctness of the program but checking that the specification corresponds to the requirements .

II.4. Different kind of test and the error they tend to find .

It seems to me that there are three level . The easiest one is the level where we are dealing only with one single module on program . The middle level is the level where we are dealing with

a complete software (this software can be seen as a logical unity from user point of view) . The last one is the level when we are dealing with the specification but this level is quite not a "computer job".

Of course, all these level are complementary and are based on different degree of abstraction . Indeed, at the first level, we are only dealing with the statements or set of statements . But there are no problem as synchronization or as mutual exclusion or as static interface (and of course as dynamic interface) . There are only three kind of actions : covering all statements, covering all possible decisions and of course all possible conditions (even when they are multiple conditions) . This is the basic test . This has to be done but it is not so difficult to prepare test cases for all possible inputs (correct or not) and compare the expected output with the real one . Once this level is estimated as correct, we go further and put together a set of these tested module in order to realize a useful software . This level is, from the point of view of this study, considered as the most important because it is the level where the problem of interfaces are. Indeed, you can consider that there are three kind of interfaces : one kind of interfaces is the user interfaces, another one is the interface between internal module of the software and the last one the interface between the software and its environment like operating systems available, tools available, ...

Here static test is no more enough . Indeed, here the time is playing a great part of the whole . We must than add the dynamic . The test cases are no mare playing with a module but with more than one . This is much more difficult because the way they are executed and the time at which they are executed and also the order in which they can be combined have also to be tested . That is once more impossible to test all possibilities but it seems that if the interfaces could be more precisely defined and checked much of the error will no more occur .

The last level is also not concerned by this study but is mentioned in order to give a complete overview of what testing involves . This level must deal with specifications . The problem is how to be sure

that they are correct . It is not enough to prove that they are consistant and complete because this does not ensure that they meet the users need what can be different of what the user says that he needs .

II . 5 . Relation between the interface problem and the difficulties in finding bugs today .

II . 5 . 1 .

As pointed before, most of bugs remain due to the interface problem (lack of checking) . The reasons or most reason I see to this, is that most of time the programs on modules are not written by the same developpers (or developpers team) . This envolves communication problems . As my short experience has yet showed to me, if the interfaces are only explained by Assembler DSECT, with a few explaination about what is the reason for checking this function and what is the return code (or result) if something is not correct, this is not easy to communicate and of course this leads to ambiguities . This is often because there is no tool (or no easy tool) for insuring that the interface is seen the same way from user as designer point of view . Moreover, as the normal evolution is to go from Assembler language to higher order languages, it seems to me that describing interface as DSECTS is not a natural wat of doing it (no many people will know Assembler) . Worse, due to the fact that a team has a deadline too short (lack of time!), what is quite always done (and in the practice, it is what I have seen!) is to offer the lesser that you can and if the users want more they have to tell it to you . This is not a reaction that will insure a good communication nore insure that things are seen the same way . At the interface, you are also dealing with the worst practice : the shared data (common Fortran; ...) which are manipulated by both the user (caller) and the module (caller) and this can lead to many problems . An other bad practice is the possibility of using defaults and once again at the interface you must be sure that defaults are handled properly . This is of course an important point when dealing with modules written in different languages for any reason .

The aim of interface testing is the validation of the fact that the basic algorithms and routines are tried together correctly .

In order to actieve this aim, let see what the advantages that we will have when the dynamic interface problem is solved .

II . 5 . 2 . Bad parameter passing .

If we except strongly happed language as ADA and as PASCAL (are there any other ?), there are no check done, in order to see that what is expected by the caller is well what the caller sends . In most languages, no checks are done at this level nor at compilation, nor at like-time, nor at run-time . This has as consequences that the way of checking the parameter passing is correctly done does not exist or if it exist it must handled by human means what is so costly .

In response to this, we will search further how to do these checks .

II . 5 . 3 . Dynamic problem .

Even with a language like Pascal (as representing the calass of strongly typed languages), it is not possible to deal with subprogram call like I/O routines or easy arrays handling. For example, if we want to write a program for matrix inversion, we want of course to write one module to do it for different sized arrays . In Pascal, it is not possible because variables are to be declared before they are used and this involves that the arrays boundary are fixed . It should be very interesting if parametric typed arrays will be available (what is lesser than the dynamic interface problem) with a high degree of confidence . As standard Pascal does not permit the use of separated compiled programs and that is too restrictive, most Pascal compilers available permit it but at price that the interfaces are no more checked and than we can no more speak about strongly typed languages .

The response to this is to find a way for handling dynamic interface but without loosing the checking of parameters .

II . 5 . 4 . Evolution problem .

Whenever you want to test a new version of some modules, it should be an easier task if we would be able to put it in previsions version of the software and see how it runs (when we pass from on release to another there are no so many things that are changing and at least the basic function remain to be handled even if it is not handled the same way) . Of course, if for doing it, you must deal with the necessity of recompiling and relinking the whole software, it is not

possible to do it . Now, because of the problem of the lack of testing mechanism, there is no other safe way to do it . When the problem here under the study is overcome, it should permist to test a new module in two steps .

First step, the checking of the way the new module handle the common functions of the new and the old software . This should permit to check more or less 80% of the coding of the new module .

Second step, as it is done now, to check only the new functions but that is only testing 20% of the coding what is much more easy .

II . 5 . 5 . Integration problem .

Whenever a great software has to be changed, several people are working each one on one module or set of module . As said above, one should test its module in putting it in the old software, but it remains then the last part which is to put all modified modules together . Whenever a mistake is found in the interface it should be changed without having to recompile all other modules . Even when using Ada it is the case now .

As response, the solution will provide means to inforce interface security and interface flexibility .

II . 5 . 6 .

In order to test some module or set of modules, one must often write a lot of short programs to verify if the module(s) under test is (are) running correctly . Indeed, in order to simulate the different calls, we put a few typical input and compare when returning with the expected result . But often,the errors seens are done in this caller program and not in the tested one . If we were able to handle variable interface, it should be easier to handle this because these errors would be seen before running them and not at runtime .

II . 5 . 7 . Some concluding remarks .

As end of this chapter, I hope that I was able to convince the reader that testing is a mandatory activity and as it is needed and thus, realized, all solution that facilitate this activity should be encouraged .

As explained in this chapter, the most difficult bugs to find are bugs presence in the interfaces . And that is precisely the aims of this study : a help for handling interfaces in both ways flexibility and strictness .

III . Debugging .

III . 1 . Introduction .

Once a program (or a set of programs) is in testing phase and once some errors have been found, we have to locate them and afterwards to correct them . The problem of localizing bugs is not a trivial task . Indeed, once some mistakes are seen, the origin of the mistakes can be situated long before the error is signalized . When we have some luck, we have a crash (and a dump) . It is a lucky case because we can see the value of the variables and so on . In the case, where the results are incorrect . This is a more subtil situation because you have no traces of when is this incorrection come from you have no more values in the variables . Once the faulty statement(s) are detected they must be corrected . But doing this correction, we must be sure that we are not introducing new faulty situations. This is not easy because, most of the time, the "corrector" is not the developper and often any of the members of the development team is no more available and than if the documentation is not up to date (which is quite always the case),some decisions were taken without explaining why . As results from this fact, sometimes the debugging process has no termination . This fact was due to the "fantom" bugs that are bugs which appair from time to time . Another situation is when the bugs are localized but as their correction is so costly and as they do not appair too often,no correction is done .

After completion of the debugging process (with some corrections done), the software is once again given to the test team . Normally at the same time all documents and comments were also updated so that they are ready for eventually further use . Finally, the corrected software is given to the user (or only the correction to be done).

III . 2 . Definition .

In order to define what debugging consist in, I will first begin to give two ways of seeing the debugging process . For being sure that we agree with what I consider when speaking of debugging, I will give what actions constitute the different parts of the debugging process .

III . 2 . 1 . Theoretical definition .

The first way of seeing the debugging process is to see debugging as :

Debugging is a process of creating models of actual behaviour from the activity of a system and comparing these models of expected behaviour hold by implementers and users of the system .

This way of seeing involves at least that users'models was correctly understand by the implementers and also was correctly implemented (that is not easy when the system does not handle fully functions) . In practice, the users have no model and also too often their model are not understand and as consequences the implementers have not the same model and sometimes they implement another one . This is what often occurs because there is no tool to handle this . For explaining this, I will give only one point . When a user defines a model, to define it in his own technical jargon and the implementations are doing the same using compile jargon and this can lead as some words can used in several sense, to ambiguites .

These facts have convinced me that I should try to find an alternative definition . The following definition seems to me to have a more practical issue .

Debugging a program is performing queries and updates on a data base the contains program source informations as well as the state of the executing program .

As stated in this definition, this involves the fact that the debuggers need to a data base where all program informations are . This has as effect that debugging is not an activity without data base. What of course is not the case . Debugging process is always present whenever a bug is .

As none definition seems to be complete or precise enough, I will give all activities that the debugging process must perform . And in the following part, I will always threat debugging in term of these activities .

III . 2 . 2 . Activities involved by the debugging process .

There are three subtasks involved by the debugging process : fault detection, localization and repair .

1) Fault detection : before testing, refers to the discovery of discrepancies between expected and observed program behavior. Indeed, when we write a program, we try to execute it . And there is only when it seems to run correctly that the program is passed to test team in order to test it widely and intensively .

2) Fault localization : That is the process of identifying when in the software (at which statement of which module) is the cause of the anormaleous behaviour of the software . This process is often the most difficult one in case of large software or in case of intensively used module .

3) Fault repair : That involves the editing of the statements to eliminate discrepancies . That seems to be the easiest part, but in case of a bug in a very often used module, it is not so easy because the correction involves consequences in very different software . This has as consequences the birth of new bugs . Fault repair has to be done very carefully with full explaination of what was the origin of the bugs and how the repairing was done (even may be the name of the corrector) . All these informations will be of interest when maintaining or debugging again the software .

As behavioral research has shown, fault localization is the most difficult of these subtasks, painding imputers for researching methods to increase the tools efficiency .

As it will be shown further, it is also the place where dynamical interface with type checking will have a great influence in facilitate fault localization .

III . 3 . In_which_context_should_debugging_done_?

III . 3 . 1 . Debugging environment .

Actually, debugging environment is often too poor . One reason of this is the fact that when anyone is starting to write some software, he has a great confidence in its ability to write it without bugs . For instance, during my practice, one has told me this story : "When all things seem to run without problem, there is always no reason for giving some money to people who are writing debugging aids for users as well as for developpers . But once there is a great problem then the team should be able to provide debugging tools in a very short time because of the deadline to be respected . What would be are seen done ? Something very easy, at the beginning of software design the necessity of debugging tools have to be inserted in the design . In summary, when constructing the original large software (moreover when operating systems or compilers),one needs to think about providing facilities that will enable anyone to provide debugging aids more easely . For more details, see in the annexe, the part reserved for (AID/AIDSYS) software . That software provides debugging aids but were not included in the design of the operating system in which these aids have hat to be included and the problems coming from this fact . Another challenge of debugging systems is that they should be so simple that their features should be learned in a few minutes, especially when these few minutes occur when the user is under stress and also should debugging tools be invoked more selectively (because, by instance, an expert does not need so many details as a"novice") . One should note that too often extra code is added for debugging aims but removed when running under common conditions . That will say that the debugged code is not the same as the running one what should be avoid . Once more,the manner in which parameters are passed needs to be considered . And also look at the interfaces if, by instance, there are modules written in different languages .

III . 3 . 2 . When is it complete .

Debugging process is complete because of two facts . The first one is the good case when fault was discovered and corrected and software seems to run none as it has to . The software needs now to return to

the test team . The other one is the bad case when fault was not localized (one tentative is to try and let see what happens,that is not a solution !). And therefore no repairing action was understak . The unlocalization will come from the fact that there is no time enough for doing it or because there is no information enough about how did the bug appear . The other part of this bad case is when the bug was localized but that the rewritten of part of software is so great that it is too costly . During my practice, I have heared of such well known bugs (infinite loop) but they know that the bug appeard not frequently and if one wants to correct it, all the kernel of the operating system should be rewritten ...

All these are the common environment of debugging process; even with new environment as ADA, LISP or so , these seems to be no improvement or so costly !

III . 4 . Different kind of debugging level and their consequences .

III . 4 . 1 . Handling one module written in low level languages .

This level is not often used todays because there are not many programs written in Assembler like language . For debugging purpose, you must deal only with dumps, traces or errors code . I can consider that it is not so difficult because when you are working at Assembler level, it has as consequence that you know quite very well the machine and also you are not concerned with default . It is also may be easy because as you are concerned with dumps and traces, you can see directly the statements assembled both at the screem in the dump and also in your listing . This of course is not the reality when writing in higher level languages . Normally, a module is not doing many tasks and there are no interactions with other program at this level, it is not so difficult .

III . 4 . 2 . Handling one module written in high level language .

This level is a little harder to handle, because if it is easier to write it and understand what it is supposed to do, it is more difficult to deal with dumps, defaults, ... Indeed, too often the dumps and traces do not handle symbols . This will say that when dealing with dumps, you are dealing with the Assembler expension of what was the statement in a high level language . It is of course

not easy for people without assembler knowledge, to deal with this kind of tools . Many efforts have been done in finding adapted tools for handling this . Another way for handling this, is to do much efforts for preventing more bugs presence .

III . 4 . 3 . Handling a set of modules .

Here the difficulties added on the handling of interfaces and the handling of time .

III . 4 . 3 . 1 . Set of modules in high level language .

The possibility of cutting a large software is one way of having more facilities in solving a problem . At debugging level, as only one module is concerned, it is easy to handle because a module is quite short and the fault localization is easier . In order to see if we can only search in one module, one is concerned with verifying that all things were correct at beginning of the module . This needs the ability to be sure that the call was wright (system call or user call, I take for this the IBM CMS/VM vision which treats always a program as subprogram of at least the system if it is a main one) . But now how can we sure that it is the situation is which we are ? Indeed, most of the languages even some recent (and presented as wonderfull!) one as C does not check anything at run time and worse, they they are not able to handle it at compile time . In other words, there are no checks done at any moment (behalve at design or specification time), in order to prove or to be sure that the call is correct . That will say that even if there is no problem found in the calling sequence, as it is never checked, the problem will only be found during the execution of the body of the program (by instance, the fact that there is some division by zero can be the result of not passing the expected parameter at the place where the module thought to find them, in this case the error discovered is the division by zero but the problem has as origin the fact of wrong parameter passing). When the problem stated in this work will be solved, check will be done at least at compiling level as it is in strongly typed languages . Then even if checks are done, the problem is not totaly suppressed . Indeed, if one gives a correct value but wrong in the sense that not expected . But if this value has to be seen as error at check time, the error will be discovered at interface location and not after .

In this sense, if you will have, guarding the same example, a divide by zero value, you can be sure that at passing parameters time, it was correctly done and you have only to consider one module and not the module and its interaction with the other .

III . 4 . 3 . 2 . Complex module .

When dealing with a very complex module (either because realizing difficult functions either because it is very often used and in a lot of situations) . Traditionnaly, the debugging process is to analyse the module and once something that looks strange is seen one corrects it and try to see if that was realy the symptoms of the problem seen when saying that an error was discovered . The more useful sentence in order to illustrate this is TRY and let see . What is of course often worse than analysing it in some systematic way . But the complexity with one has to deal is sometimes so great that no one sees a formal way to solve it .(Keeping on mind that there is always a deadline process) Now what difficulties are added ? I think that this kind of difficulties is the most difficult to handle because interfaces problem o· interaction problems are not state problem. That will say that you have to deal with dynamic problem which can be far from the discovered bug . At crash time, you can see the problem,(by instance, dividing by zero) but why is this variable containing this value ? That is an other question very more difficult to establish . Than,at this time we must deal with interactions, here dumps are not very helpf·ll, traces are more valuable, but traces are slow and once more, we are dealing with machine code and registers . If you will write it in a high level language and must deal with traces at this level, I think that we will not be able to solve anything . Therefore, was established symbolic traces but there are no tools in tracing directly high level language statement (that should involved a trace for every language!) . And then, finally, we come into the higher level debugging process . It is of course the worse handled level . We should write a large software using different language by instance, part in a high level language, part in Assembler and worse part in one high level language and other part in another (even another one is a third one, ...)

III . 4 . 4 . Concluding remarks .

These reflexions lead me to this conclusion : Nobody really knows what to do with bugs in complex system even if there is a number of ideas of systematic testing and by careful program structuring associated with some systematic view of the segmentation of a composite system into subparts and of the degree to which these subparts interact. Such segmentation would be interesting, we have none . It seems to me that they are the reasons why the idea of the theoretical EL DORADO of debugging (the idea of proving program correctness by formal mathematics methods) is still alive . Why is this only a dream ? First the general problem of proving algorithms equivallent . This problem is in the technical, mathematical sense unsolvable . This is bad enough, but still worse, the algorithm equivallence problem is unsolvable in a very strong sense . There does not exist any finite set of axioms from which proofs can be elaborated to cover all possible cases of algorithm equivallence . And worse in order for such assertion to be relatively decisive, the proofs to which one refers must be checked by a formal algorithmic mechanism and has to enter in an infinite loop . But in order to be not so pessimist, I have to say that all these research has lead to a number of valuable suggestions as structured programming, module and data design ideas and the concurrent processing and synchronization idea (see references for more details) . All these suggestions have lead to increase software quality but nore has been done in order to eliminate the software crisis (if possible) .

III . 5 . Which part of debugging is the most difficult ? and their relations with this study .

It seems to me that the most difficult part of a debugging process, as said before, is to handle the debugging process with large and complex software . As often, these software are written with different languages, each language haing its own convention of representation of variable, and of the interface communication .

III . 5 . 1 . Interface enforcement .

When the problem will be solved, you should be able first to see if all calls were done correctly . That is the fact that if any caller executs a call in a wrong way this call will be flagged before execution . That is quite easier to handle than the today situation where value are interpreted as correct without check . This, of course, gives you a easier way in detecting errors instead of having to deal with erroneous results .

III . 5 . 2 . Handling complex software .

If we want to replace a complex module (not complexity because of the environment but the coding complexity) with a lower complex module, for example, if we have found another algoritm for doing the same and suppose that the new algorithm does not require so many parameters. Now, how would you do it ? If it is replaced in an existing software, what will be the result at the interface and when called? Thus, you are loosing many advantages of finding a new solution . What I propose to do is to find a way of both checking the parameter list in order to verify the correspondance between parameters and giving a way of handling different number of parameters . Than, solving this kind of problem .

III . 5 . 3 . Handling large software .

If we want to realize a large software, it is a good idea to cut it in pieces (called module) . But the problem is that there is no means in order to see how to cut it correctly . Whenever a module is designed, there is a interface between it and the others . Then there are many interfaces and as seen, the interfaces are now not handle by computers (not enough nor easily) . This study should provide useful mechanism in both assuring that the interfaces are correctly handle by both part (caller and callee) . But a software is always evoluting and what is often done is to add new modules or add some new functions to existing one . This actually involves recompiling and relinking of all the software concerned by this module . Then, when the solution is found, it will be possible to deal with this situation without having to recompile the whole .

III . 5 . 4 . Integration .

If we are dealing with integration of a set of modules, now we usely are confronted with the fact that the parameters passing mechanism is not safe enough in order to insure us that there is no problem . I mean by that, that if in PL/I, I pass a parameter declared as real in the caller and that the corresponding parameter is declared as integer in the callee . When executing the call the string of bits will be interpreted as integers representation, this will not lead to an error but to erroneous result . The problem is how to see that the erroneous results are comming from this ?

Once the problem is solved, this could no more occur . Indeed, at the moment the checks are done,this will have been flagged . Thus, whenever an error occurs, we are sure that this is not at interface level . This can help a lot because you can act as all modules are independant because all interfaces are correct or are flagged .

It is quite easier to handle module one after the other than having to handle the whole system and the interactions between modules .

III . 5 . 5 . Some concluding remarks .

1) As debugging process is not easy, it should be possible to add tools for helping the debugger whenever it is a debugging process . As these tools are very time and space consuming, it is not possible to let it always present in the system . It should be possible to convert the production environment into debugging environment . This should be easier if the flexibility of interfaces are great . Indeed, for having more debugging functions, we can have as solution to have different module (from the level of help given) . This of course should needs additionnal parameters for handling the new functions. At this time, it is only a dream but ...

2) The solution will than have as good effects to permit more security when we are using interfaces and also more flexibility . The only problem is to be sure that there exist an economical solution . Indeed, if the solution involves both time consumming and space consumming and moreover, the rewriting of many things, it is not a solution even if computers are becomming each time more powerfull .

IV . Maintainance.

IV . 1 . Introduction .

Maintainance is a part that always exist when some software has a working life of few month or more . Whenever one write some software and of course it is the fact for large and complex software, one has to think of the maintainance problem . Maintainance is the most costly activity in the all informatic activities . It is not easy to see what is exactly maintainance . In this introduction let say that maintainance consist in all activities that a software needs in order to be usable . This is presented at third position because some of the maintainance activities are constituated by debugging process and sometimes also by testing some extension of an existing software . That is also strange that all these three kinds of most software engineering activities are so interrelated . But each is situated in a different context, maintaining is more a managerial process which involves much knowledge of the all software and also knowledge of how dealing with the process of software extension or evaluation.But there is no formal or theoretical view of what should be done in order to improve further facilities for developping or extend the software . Maintainance have to deal with so different kind of knowledge as hardware knowledge because during the life cycle of a program especially when dealing with operating system the evolution of the hardware will also involve changes of software . Then, some people responsable of maintainance should have a multidisciplinary knowledge (economy - gestion- planning - informatic) And there is no such kind of study . Then often the maintainance will lead for a long time (as seeing from now) into problems because there is nobody really educated in order to accomplist this function . Moreover, maintainance is not often (if sometimes) considered at design time when the software is created . Indeed, as for debugging purposes, maintainance has to work on software which are very difficult because of some practice (as patching) . These practices are very bad both at debugging and at maintaining step and that is very strange because both debugging and maintaining are mandatary activities which come from the fact that a software exist and is not coming from any artificial need .

IV.2. Definition.

The definition of maintainance is quite simple but this definition implies many different kind of activities. Maintainance is the set of all activities needed in order to assure the viability of a software.

In order to have a more precise idea of in what consist the activities of maintainance I will define the most usual part of maintainance activities, I will divide maintainance activities in two parts. These part constituing all activities needed in order to adept the software of an evolued environment. The part required by extending the software in order to meet some new user's requirements.

In the first part, we will be concerned with debugging all not yet discovered errors so that the software will be corrected and then runnable. Another part, is adapting the software in the new environment. That is either the hardware has changed and this change needs to be adapted to software because without changing, the old software is no more able to run either the tools have changed (tools as compiler, operating systems, ...). These changes have as consequences the modification of some interfaces or, sometimes, the modification of some module.

In the other part, we will be concerned with adding some new functions that were only useful at some priviliged user. By instance, for AIDSYS, I was confronted with offering some functions that were not available for "normal" users but which were disponible for system developpers. This is also seen as a maintainance activity because otherwise users would not like to one or even worse will not use the software anymore. In the same kind of activities, there are some additional tools or some additional functions that should be added to a software because of debugging aid or any other tools like that. This is not the same kind of activities that are implied for developping new software because when you are writing some new software, we can start from nothing that yet exist but here we are restricted in his choice because what is added has to be compatible with the older use of this software. It is sometimes more difficult because some part which need to be modified can be very old and not so easy to

handle . If it not the case if the software was well written, that is easier to add a new part without having to write all parts but only some extra coding .

IV . 3 . In which context maintainance should be done ?

As pointed before, whenever we are concerned with maintaining some software, we are confronted with very many different kind of activities . First, any maintainer should know what was the aim when this software was designed . It is quite important because this kind of information can help in understanding some reason of unexpected coding . Indeed, sometimes after a more or less long time things have changed but the code still remains . After knowing the beginning point of the study of the software, it is very important to have a good documentation in order to see all changes in the aim of the software and why these changes occured. This is important to understand why the software does what it actually does and also why the software takes this form . By instance, why it is cutted in the way it is . When all this can be obtained, what is often not possible because at some times no traces of changes are guarded for any reason (no space enough, not used, ...), we can see what was and is the global context of the software and can decide wether there is something to change in order to adapt it for futur use (sometimes code was done for small machines) . More many times space problem was a very heavy constrain. This constrain can have a very important effect on the style of the software . It seems a good practice to remove it when adapting it to some new environment . Once this history has been established, we have to understand very carefully the whole software and more important the interactions between all parts of the software . This is very important because that will enable any one to do any change with all the knowledge of what are the effects of this change . Indeed, in practice too often changes are made without knowing all these interactions . The result is that once the change is made, wrong comportement of the software is its consequences . And as I think, it is the maintainance team responsability to maintain coding when all changes are made at source level instead of doing it at

object level (Patch) . Also all old code would be removed by the team in order to maintain all software parts proper and understandable . It is the reason why all side effects of programmer activity should be verified, at maintainance level, by the team in order to be sure that documentation was updated at the same time as sources was and also as object was if there is no way in practice to avoid patches . I should mention that if maintainance is so difficult to do, it is because all steps before from designing to coding was not done with the goal on mind to do it with all precautions and all features that will be needed further . Too often, maintainance has to be done upon misconceptionnal software at any level this misconception occured . Maintainance should be a easier but very easier if all steps before were done carefuly. These step starts with specifying and ends with coding through documenting . If specifications (and their evolution), coding style, comments and the environment (operating system, machine, ...) are clear and understandable, maintainance is no more a software lack .

IV . 4 . Different level of maintainance and their consequences .

There are several levels of maintainance . The lowest is the level of module maintainance . The middle one is the maintainance of one part of the software (by instance, AID - AIDSYS) . The highest is the level of a product maintainance . The lowest level is of course the easiest but it is not as trivial as one should think . In fact, if one needs to maintain a module or few modules, one needs to have somebody from which he can have all informations needed in order to do its work . Of cours, if it is only a repairing action, one can do his work without having to communicate with someone else but often one is not sure that the cause of the error is in its module or in the module of other maintainer . That is not an easy situation . If he needs to implement some more functions or to modify an existing one, of course, he must have a clear paper which describes what are the users's requirements . But as any one knows, even the clearest paper must be explained because there are always some obscur point . For doing it, he must communicate with other people, mostly the user who has asked this change and the responsable of the maintainance of the product . As the easiest level it is not so easy to handle .

The next level deals with maintaining part of the software . As a software is large or very large, it is cutted in several parts each one has its own responsable . At this level, the complexity of the work has increased a lot . Indeed, now a large part of a software has to be known and also the interaction of the modules that constitue part of this piece of software . Then, we have to deal with the interaction of this part and the others but also with the parts of his piece . Many time, also one has to deal his piece with others "under" him . We have then to work with computer but also with men . That is always a difficult thing . One dealing with that work, is confronted with the fact that his men changed and then he has to forme another one . We have also to be sure that the work of the level spoken user is done correctly in such a way that it becomes not heavier to maintain in the futur . That is an incredible more difficult work and as it is at a higher level it is often a level where quite no coding is done by him but much more administrative work . Sometimes also we have to see with the users if they agree with this part of software or if some changes are needed . If some changes are needed it is a responsability to give this work to one of an crew .

The highest level is nothing more than the one described just above but dealing with a larger software and dealing with all users of the product . It is the reason why I will not enter in more details for this level .

In conclusion of this, I will say that at any level, work should be easier if software and its environment is clearly known and easy to modify in the sense that tools exist which are flexible but also are strict at use point of view .

IV . 5 . What are the most difficulties encountered when maintaining ? and why ?

As part of maintainance activities deals with debugging and testing, these difficulties were treated above in the correspondant section . The only activities treated here are the activities proper to maintainance activities and not refering to testing nor to debugging .

IV . 5 . 1 . Forward compatibility .

One must say start from the fact that the lack of forward compatibility is troublesome . This problem seems to be currently about the worst compared releases of packaged software generally . Here one insists on the fact that more flexibility is needed in order to be able to handle further releases of a software . One reason of this lack of flexibility is the fact that there is no easy means in order to change only one part of a module without having to consider all interactions with others (and if it is an operating system and that the module to be changed is called or should be called directly by instance, by SVC , there is no means in handling this module because it is not possible to see where it is called nor when . When the problem is solved even with this kind of call, flexibility will be increased without loosing precision . Indeed, at this time, there is no means of insuring that call are done in a right way . Only for this reason, if it is possible to find a mechanism to enforce the checks during calling time it should yet be valuable . And here it is tried to find easy mechanism not only to insure this checking but also to insure flexible ways of grouping modules in order to have not a rigid construction .

IV . 5 . 2 . High level language .

With high level language and especially language of the fourth generation, module interfaces will become both explicitly and implicitly complex and extensives in such source code . This is a real point because as anyone who has programmed a lot knows it is quite always in the interfaces that problems often occur . This problem which I try to solve is at this interface level . Of course, the way it is handled here is not at a high theoretical level but at implementation level . It is not because theory is not important, but simple solution, even not complete, but usable in practice seems to be better than doing a good theoretical solution but to heavy in the sense that the means to be used in order to put this theory into practice too expensive . For this reason, the solution should be found, at compiled time or/and at link time or/and at operating system time (run time) .

IV . 5 . 3 . Tacit assumptions .

Default and tacit assumption are troublesome in maintainance and especially when this occurs with the interface. The searched solution will not accept default during calling handling . The solution is to check wether there is a correspondance between what is given by the caller and what is expected by the caller . These checks do not permit to have default but shuuld ask for explicit information and if it is not the case, this will lead to flag the software . Then what it is looked for is a mechanism which gives more flexibility in the way modules can interact but also enforcing the links between the modules or it is decided which one has to be used with others . This flexibility will also enforce the use of short program because it enforces the maniability of their interfaces .

IV . 5 . 4 . Concluding remarks .

In conclusion of the whole chapter, I can say that whenever problems are situated at interface or interaction or information passing between module, the solution of the problem stated here will increase a lot both flexibility and precision . That is the reason why even if not all cases are handled these which are handled are valuable enough to justify all the time what were spint during this work .

Part 3 : Theoretical Purposes .

I . Introduction .

Once the problem is seen and established (as it is !), we have to see what are the different parts that constitues the problem . I will divide it in two main parts . The type checking problem and the handling of variable parameter list .

I . 1 . Type_checking problem .

At present, indeed, no many languages are handling this check . I will deal with ADA and Pascal as representing the languages that are doing the type checking . They are not alone but, for example PL/I, the checking is done only if there are internal procedure . If there are external procedure, then, no checks are done . If we take another language, like CLU, the solution taken by CLU is quite the same than the solution taken by ADA . Indeed, CLU takes a library of description units and a compiler environment . With these tools, it is possible in a certain measure to modify the interfaces because this is handled by the compiler environment. For more details, see the CLU Reference Manual by B. Liskov and all, edited by Springer Verlag (1981) .

What I mean by type checking, is the check of the correspondance between the parameters list defined in the caller program and the called program . This correspondance must be veriflyed to be biunivocal .

I . 2 . Variable_parameter_list .

Once the check is handled and there are no more problem with it, it remains to find a way of handle the same problem with less contraints. This is the fact that we must find a solution of handling parameter lists that have no more a so strict correspondance without leasing the advantages of doing the check .

II . Analysis of the possibilities of when doing the checks .

In the litterature, there are mainly two periods during which this can be done . Personaly, I will suggest another possibility which seems to me a more interessant time to do it . As I will show the problem will always be constituted by the description of types and the handling of these descriptinns . There are then three possibilities : At compile time, at run-time and at link time .

II . 1 . At compile time .

Duting compilation, the compiler has to handle all variables and their types . It is quite always done in a table . The problem is that we can not use this table because this table contains too much informations . It is then quite a n normal thing that the first idea in solving the problem is to do it during compilation .

What that means is that we must find a way of putting the only useful part of these table somewere in order to use it after . This will, then, resolved great part of problem but it still remains that if we have the informations, how will we use these ? Indeed, when we encounter a call, we put all information about the call somewhere but how will we be able to decide if the call is correct or not ? For dealing with that, I will divide this in three part : ordered compiling, semi-ordered compiling and unordered compiling .

II . 1 . 1 . Ordered compiling .

In these case, the compiler will look at the data base in order to see if there exist a solution in the data base, with as key the name of the call . If there exist nothing(no modes) in the data base that meets the call under examination then the compiler can decides that the call is not correct . What actions the compiler takes afterwards is not an aim and is the responsability of the compiler design .

If the compiler finds a mode which handle the description of the type of each parameter of the call, he can decide that the call is resolved . Of course, this means that there is no problem if it is compiled with the same compiler version or same compiler . If it is not the case, we must find a way in which the types descriptions should take a standard form . This form should then be defined as

possibily handled by all different compilers . This, of course, does not mean that they are dealing the same implementations of the types but only that they deal the same representation of the type .

It is called ordered compiling because we must start with compiling program that do not have any call in it but what are called . This force you to work in a bathone up way what is not actually what is usually done . Indeed, todays methods are more top-down . This of course is not a good way of salving the problem to force to realize the software at logical level in a top-down way and then to be forced to realize it in a bathone up manner .

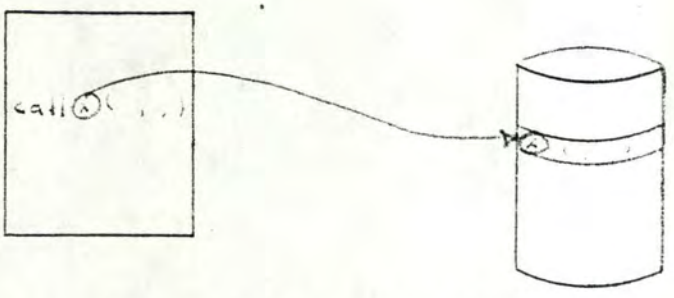
II . 1 . 2 . Semi-ordered compiling .

In response of this critic, we can mention another way of solving the ordering problem . This is the solution taken by ADA . Indeed, in ADA, you must declared and defines all the interfaces . Once these interfaces are compiled, you can use abstractions what are defined at the interface level and the way they are implemented has no importance nor the in order . In fact, when the compiler must compile a body (implementation), it can refer for solving the call, to the definition of the call which is defined in the interface .

For example, in ADA, it is done as follow :

There are three kind of things : 1) the utilisation
2) the description , what
3) the implementation

happens when compiling :



As all interfaces must be know, before that something else can be compiled, whenever it encounters a call, it takes the name of the call and as this name serves also as identifyer, it tries to find

the description of this object . Two things can happen . If the description match what it is used in the call, then it is correct and we can continue the compilation . If the description does not match, it looks further in order to be able to handle the overloading . If none matches, then we can sure that an error is detected . The reaction of the compiler is not own purpose .

This has, as effect, that we must not write the modules in a bathon up way . This solved than the type checking problem but with a price, the obligation of having a data base . This data base must be used very often, as we know, it is not easy to manage such kind of data base when many changes are done . There is also, as consequences, a time consuming as a space consumming quite big with this solution .

II . 1 . 3 . Unordered compiling .

If we do not want to have such restriction of ordering the way in which module have to be compiled nor having to writ all interfaces (it is may be not a good practice but you do not deal only with system that contain a way of handling a data base so easily) . But, if you want to do the checks, you can only work with fils but this involves the following problems :

Whenever the compiler has to compile a call, it can not see wether it is a wrong call or a right call . Indeed, if there is nothing that meet the call definition, this can not involve that it is a wrong call . In reality, may be, the called module is only not compiled . We see directly what this means, how or when is it possible to decide wether it is a wrong call or a right call .

One solution to solve that is whenever a program is compiled, to look at it and see if this program under compilation is giving a solution to a call not yet resolved . This has as conseque ces that all unsolved call sequence must be guarded totally in memory . Suppose that these descriptions of interface not yet resolved are put in a library .

Once a program is compiled, its description must be put in the library and it must be search through the whole library in order to see if this description are meeting an unresolved external of another program . Its description must be guarded because no one

knows if afterwards then will not be other program to be compiled and which calls this one .

Once a call seems to meet both description and name of the call, then and only then the check can be done . But, hwo to decide what actions must be taken . Because, if we accept the fact that the verifications can be done after compilation, the error will be known only when the caller is compiled . The error is then from caller part of the all calls . And now, which one must be advised that the error is in its coding ?

It seems to me, that as showned, in all cases if we want to execute the checking at compilation time, we must force the users to conforme them selves to an ordering of compiling (ordered or semi-ordered) . The unordered solution needs to exploit to much informations and not useful in practice (see fig 1) .

II . 2 . At run time .

Here, we must handle the type description but without having any possibilities to refer to symbolic definition . Indeed, at run time we must only interested in strings of bits (0 or 1) . This forces the compilers to find a way of describing the types expressed only with 0's or 1's . And also in a way such that there are no more ambiguities otherwise it is easier to do no checking at all .

As type definition can be very complex and can be combined in a "infinite" way, we can not have such a description . For example, if the parameter type is an array or a record we can have :

```
Type
     T2 = (DO, RE, MI, FA, SOL)
     T1 : set of T2
end ;
      A : array [1 ... 30] of T1
```

The array can be represented as :

because array do not permit different kind of elements

fig 1.

P_2 :

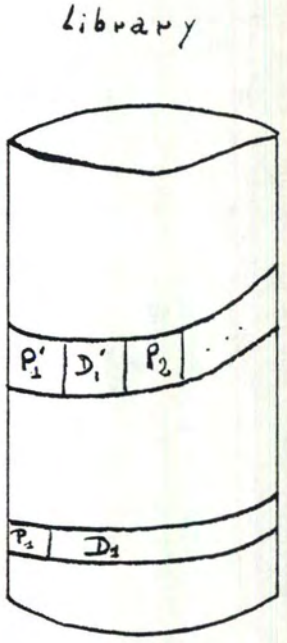
```
[ ⋮
  Call P1 ( , , , )
  ⋮ ]
```

P_3 :

```
[ ⋮
  Call P1 ( , ,   )
  ⋮ ]
```

P_1 :

```
[ ⋮ ]
```



- We must talk about the problem of consistancies of the library . Indeed, if P1 is compiled, its description is set in the library . If we have a call from P2 that meets this description and a call from P3 that does not meet it . If we say that P1 description (P1, D1) is the normal way of calling it . Then we can decide that the call of P3 is wrong . If we have not yet compiled P1, we don't have its description . Thus we can not decide wether P2 or P3 call is wrong . When we compile P1, we can check through

whole library the descriptions . In doing it we can see that P1 description described by P2 is meeted by the P1 description handling now . But, when can we decide that P3 is wrong ? It is also possible that P1 has no correct interface, than P3 can be right and P2 wrong and P1 also . Once one solution is found, for example, P3 call is wrong we must taken a decision, we must handle different description of the same thing .

- If we accept (and for large system we must accept it!) that some modules have the same name (same entry point name). We can see to what problem we arrive . During the check, we can say that the first encountered is the good one, or if it does not meet the descriptions for the first, we must pass to the second, and so on . And after all, we can not decide the wrong case because may be afterwards, the correct P1 will be compiled . This leads to unmaintainable solution .

- When deleting a module or replacing an old one by a new one , what must be done ? How can we sure that all programs referencing this module are advised ?

For records we can have such description :

```
Type
     T1 = record
          A : array [1 ... 10] of real
          B : Integer
          C : real
          .
          .
          .
     end ;
var
     T1 ;
```

The record can be represented as :

We can directly see how difficult it is to define, in a manner such that this leads never the ambiguities, all possible types only with string of bytes .

In order to show the difference of complexiti between compile time and run time, let us see it, with an example (fig 2 & fig 3).

In fig 2, we can see that we must not handle the description of the parameter . Indeed, during the compilation, the compilers must handle the declarations and for doing it, they put the variables declaration in tables . The real way of doing it, is not an purpose but, let say, that the compiler put all variables af the same type in one table (it is not the case, but it simplifies the explaination without changing the nature of the mechanism) . Thus when compiling the subprogram, it checks wether the parameter definition is well of the same type (integer in the example of fig 2) . It can do it because it has the description within a table of one type and ca see if it finds the same symbol in the table or not . If not an error is found .

In fig 3, we must not only handle one table of parameter, but two table of parameters and their corresponding type description . Indeed, one was constructed during the compilation of the caller program and the other one was constructed during the compilation

fig. 2

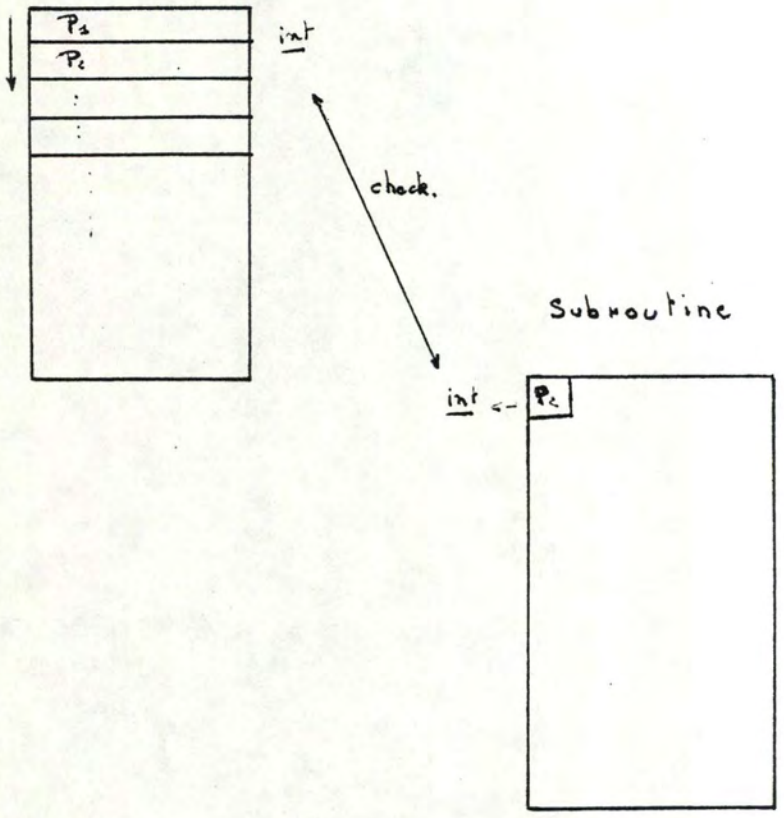
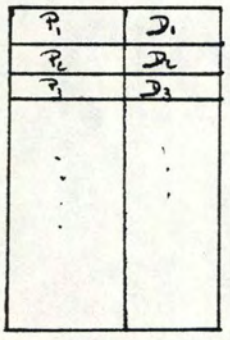
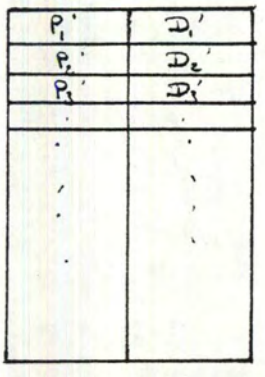

P1
P2
int
check.
Subroutine
int <-
P2

fig. 3


P1
D1
P2
D2
P3
D3


Subroutine
P2'


P1'
D1'
P2'
D2'
P3'
D3'

of its subprogram . What must be done here is to prove that the description of the type of each parameter are equat . If we use some formal way of saying it using the notation of fig 3, we can say that what we must prove is :

$$\forall\, i\,,\ i \in [1,n] \quad \begin{array}{l} D_i = D'_i \\ \text{and} \\ n = n' \end{array}$$

when n is the number of parameter of the caller parameter list and n' is the number of parameter of the called parameter list .

Saying it by this way, shows the real problem which is to what point we must have a description D_i such that we must be able to prove that $D_i = D'_i$ and at the same time we must be sure that it is not possible to prove that $D_i = D''_i$ when $D'_i \neq D''_i$. This means that we must have an unambigues representation of type declaration .

Of course, if, for doing it, we must copy the whole description, as it is in the source text, and put it in the parameter list description table, we will have a serious problem of response time . Indeed, let try to see how much overhead this cost . Whenever a call must be performed (calling a system function, a standard module, or other module) what is very often done, if not always, we must check the corespondance of the type . This involves the fact that we must compare pieces to pieces the description of the formal parameter and the actual one . This creates the need of may be lot of space for putting this table in central memory and a lot of time for doing the checks . As the type declaration, for example in Pascal, can be very complex as records of records, this can consume so much time that whenever you want to execute a program, before having a response you can go away to drink some cup of coffee (or tea if wished) . This is a price that none of concepter will accept to pay .

An other example to show that even if the problem state before is solved, there remain some other problem :

fig 4

caller program

```
Type
    T1 = Integer
end ;
var
    A : array [1 ... 10] of T1
    .
    .
    .
call subprogram (A, ...)
    .
    .
    .
end ;
```

callee program

```
Type
    T2 = Integer
end ;
var
    B : array [1 ... 10] of T2
    .
    .
    .
    B [5] := A [5]
    .
    .
    .
```

I have taken integer in order to simplify the example . It should be user defined type declaration instead of integer . That would complicate even more this example .

How can we find a way of describing the type of A in such a way that we can decide wether the type of A is the same then the type of B ? Of course, as we can see normally, the decision should be yes ; they are equivallent . We must think that we are at compile time, and we have only descriptions and their descriptions are not the same because A is an array of type T1 and B an array of type T2 .

This short and quite simple example shows that the problem of doing the type checking during the routines involves a so costly and complex solution that I will not further continue to speak of it . Because if we are not able (or not in economical way) to handle the type checking, how can we solve the problem much more complex of handling the dynamic interface .

II . 3 . At link time .

Before trying to explain what happens at link time, I will first show what a link edit actually do. This is the IBM implementation, but, all link edit perform the same functions even if they do not accomplish these the same way .

II . 3 . 1 . What is a link editor .

The linkage editor takes the output of the compiler and prepare your program for execution . The output of the linkage editor is executable by the computer . The linkage editor can combine your program with other object and load modules to produce a single load module . It stores your program in a load module library . Thes load modules can be read into the computer and given control .

The output of the compiler contains these kind of "cards" : the ESD (external symbol dictionary), the TXT (text = statements compiled or Assembled) and the RLD (relocation dictionary) .

In this study, we are only concerned by the external symbol dictionary when all information of the calls and external variable are put. (It describes the control sections and external symbols defined in the module, it helps you fing references between modules in a multi modules program .)

For seeing an example of an ESD see fig 10

For seeing an example of a link editor, seefig 11 .

II . 3 . 2 . Introduction .

I have thought that this will be a possible place for doing checks (even if it is never talk about) . Why has this come to my mind ? Well, after link time normally, you do no more compilation . This leads me to the idea that it will simplify the problem of ordering the compilation . Also you do not so often a link operation as a compilation of a program (in theory, this can be discussed but in practice not) . Than if the cost of doing the check at link time is more or less the same than doing it at compilation, it will better to do it at link time . Let us then see what involves the fact that we will do the type checking at link time .

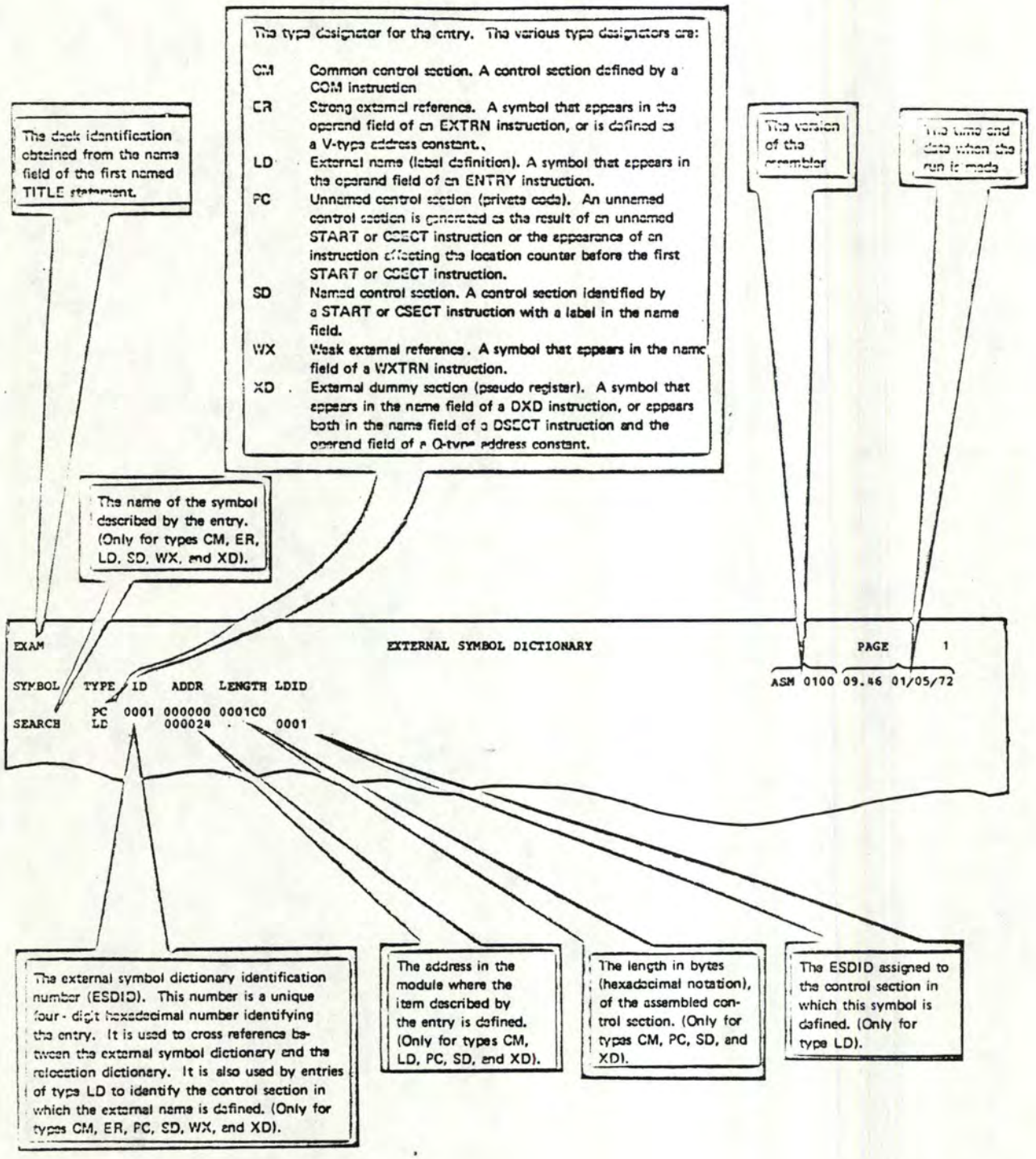


Figure 10. External Symbol Dictionary

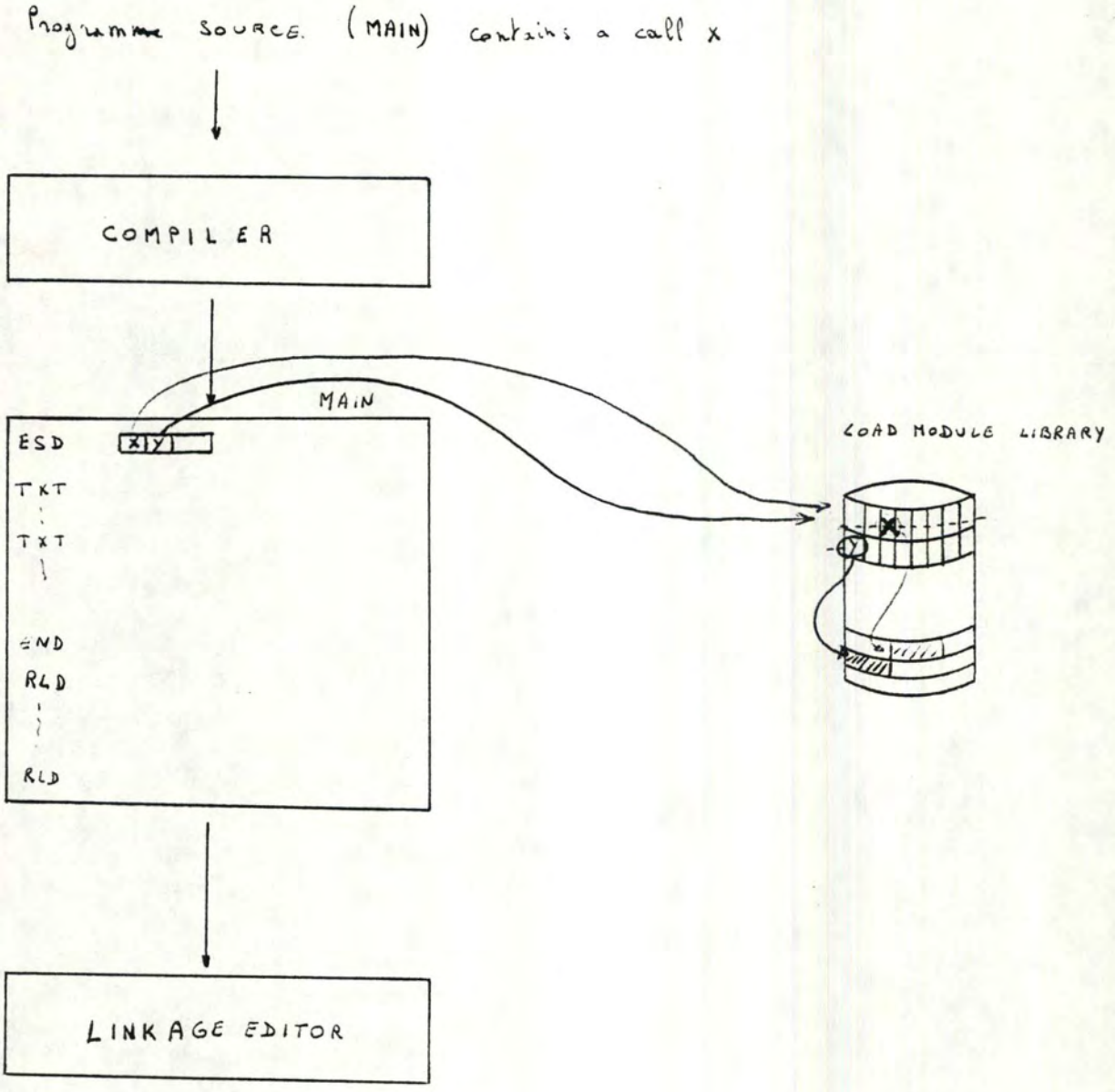


fig 11.

During the link editor, the linkage editor tries to resolve all unresolved symbol that are in the ESD card(s) . If it can not do it, it gives an error message . But it must also try to resolve all relocatable problem (calculation of adresses, put the lenght of first module to the start adress of the following one, ...) . After link editing, you have an executable module when all things are defined and adressed .

II . 3 . 3 . Needs for type checking at link time .

II . 3 . 3 . 1 . What is expected from the compiler ?

Of course, as the link time never see what are the TXT cards, it can not see what are the call or when they occur . This involves the fact that the compiler has to give some additional information that it does not yet give today .

The compiler is expected to put the type description of the variable (as it does put it in a table for its own purposes) somewhere . This is the compiler will put the type description both in a table as it does it yet and in a file of unresolved external references .

That means that whenever the compilers finds a call, it put the call description in this place . The call description can be sure as name (program name or entry point), and as attribute (parameter list with their type description) . These informations are the only ones to be kept . Once the compiler has done its work, the compiler store this table in a file which will be used by the linkage editor when all patrs of necessary information for type checking purposes and for number of parameter checking purposes are . This way of working can permit overloading as the compiler does (of course, if it does not, it is not possible) .

II . 3 . 3 . 2 . How to use these informations ?

When the linkage editor is invoked, it look for the ESD of the main program and try to search through the file in order to see if there is an entry with the name of the ESD under execution . There are now three situations . First one and easiest one, it can not find any matching description within the file with its entry point name . Then the result is saying that an error has occured (we will see in part III, how this can be done in practice but also what precision can the error message have) . Second one, it find in the file the description associated to this entry point name and the problem is now to see if its associated description match the description of the ESD under checking . (This is to see if all parameters have the same type and if their number are equal) . If the correspondance between the description can be established then we can go further to see if another call has to be resolved . The third is the same of the previous one but here we can not establish the

correspondance between the descriptions . If we permit overloading we go further in order to see if we find any that match and we are in the situation described before or we can not find any and we have an error . Of course, if we do not permit overloading, if we find a distinct description associated with the same entry point name, we can yet decide that we have found an error .

Of course, as we are only dealing with theoretical purposes, I do not give any solution because this will lead me to give implementation detail .

II . 4 . Comparing the different acceptable solution : at semi-ordered or ordered compile time and at link time .

II . 4 . 1 . Modifications involved .

II . 4 . 1 . 1 . At compile time .

We must modify the compiler but we must not change any thing from logical point of view . I can say that the only thing to be change is the fact that the compiler can not delete the table of description of the vatiable type, but it must put the externals one somewhere in a file . This should not require to modify too much the existing coding .

We must of course add the check ability to the compiler . This involves to change the handling of calls, when we must check what is found and what is expected to found . This means that the compiler knows when these interfaces descriptions are and that it can access them this ability is the most heavy modification .

We must also have a possibility of defining the interfaces in such a way that the compiler is able to use it .

II . 4 . 1 . 2 . At link time .

We must modify the compiler in such a way that the information, the compiler put in a table must be put in a file in such a way that the checking can be done . This does not involve to modify the logic of compiler .

We must modify the linkage editor in such a way that it can do the type checking . This does also not involve the modification

of the logic of the linkage editor but only to add a new module which will accomplish these functions .

And we will, may be, have to do other changes (see implementation) at the operating system level .

II . 4 . 2 . Constraints involved by the type checking .

II . 4 . 2 . 1 . At compile time .

As said before, for doing it at compile time we must introduce an order in which the module must be compiled . For example, ADA forces the user to compile all interfaces before to begin to compile a body . Worse, it is not said precisely, at least in the ADA reference book, what a modification of an interface involves . In fact, it seems that for handling it for packages we are in a semi-ordered solution and if not we must recompile the whole . This is because whenever we modify the interface we will not be able to determine precisely what was their interfaces on the whole software .

II . 4 . 2 . 2 . At link time .

It seems that here we have no constraints at user point of view . Only the system must handle file for access and consistancy but it is done yet now .

II . 4 . 3 . Advantages of each method.

II . 4 . 3 . 1 . At compile time .

We must say that this solution involves no too much modification and this modification is situated only in the compilers .

We can see the obligation of defining the interfaces first as an advantage . Indeed, this will forces the designers to begin with defining the interfaces so precisely that they would not evoluce .

We can see that the handling of the solution is simple . Indeed, the interfaces are defined, when a call is encounter, it takes this description and look to the corresponding interface definition to see if the definition of the interface and its instanciation is the same .

II . 4 . 3 . 2 . At link time .

We must say that doing it at link time involves only the cost of the check only when the programmers have no more error at compile time . This means that the cost of the check is only to be paid once during the link and neither when compiling nor when executing

the software .

We can see that there is no obligation of when compiling the different part of the software . This involves a greater flexibility .

We can see that the error message here will be very precise because the linkage editor does not yet handle so many error message and because we know what type of error we can deal with .

This will not force the system to have a great management of fils (or, as ADA, the handling of a data base with all problem of consistancy .)

II . 4 . 4 Conclusion .

I prefer the link solution because it is not the practice, in most cases today, to define precisely all the interfaces before going to begin to code . Indeed, whenever some modules are defined, we can begin to design them . At compile time, this will no more be possible, because it is expected to have all the interfaces defined . Moreover, whenever an interface have to change we must recompile a lot of modules .

Another advantage is the ability of having a more flexible reaction . Indeed, if the checking at compile time can be sure as good when using the modern methodologies of programming development, it is no good if these methodologies are not used what is often the case today leading to loose the practical interest of this solution .

As compiling is done more often than linking, the cost of doing the check at compile time is more costly from time consuming point of view . Moreover, if the type checking must be done for different languages we must modify all compilers for the whole modification when there often exist only a linkage editor .

The precision of the error message can be greater at link time because there are not so much possibility of different kind of errors comparing with the great number of possibilities when compiling . This should have a major advantage for maintainance and debugging .

When seeing the implementation, we will that the modifications involved by doing the type checking at link time instead of doing it at compile time, are not great and often can reused what is yet used without modification .

III . How to handle variable parameter list .

III . 1 . Introduction .

As for type checking, these are three moment during which this can be handled . The problem here is to find a good way for doing it without having to use switches or other means like that . In the same time, this handling should not be visible by the users . From logical point of view, this can be handle at the same time when dealing with type checking . It seems obvious that in production environment this can not use often, but in development environment well . I will no more consider the run time nor the unordered compile time for handling this because yet for handling type checking they are not useful .

III . 2 . At compile time .

III . 2 . 1 . Ordered and semi-ordered .

We must do it in such a way that the type checking can be done and such a way that it would be possible to handle variable parameter list . We must then find an "extended type" such that $D_i = D'_i \quad \forall\, i$ but when some D_i have a special type .

On logical mean of doing this is to say somewhere that the old interface is no more valid but that the new one has to be used . This means that the compiler can do the checks with the old interface definition and description but will execute the program with the new one .

This of course can not assure the user of the module that tha old call and the new one is compatible . Indeed, there is no way nor mechanism for doing it without man responsability . Thus, I have to recognize that no full automated solution is found . I will let to the conceptor of the module that he (she) replaces responsability of the compatibility between the old and the new call . It is not possible to let to the compile or to the system the responsability of checking all possible changes that have to be done in order to insure this compatibility, there are too many possibilities . But, the compiler or the system have to provide him (her) with a mechanism that will give hime (her) the possibility of checking which call

it is confronted to .

I will treat this as a special case of overloading but in a transparent manner . I mean that the user must not see any of this kind of changes .

The problem is how to do for maintaining the consistance of the data base . Indeed, how can we deal with such situations that some records in the data base are flagged but can not be deleted . Moreover, the logical description will not cover what is actually done . Whenever an error is discovered at run time, for example, how can the user deal with such a situation where the code executed is not the code that the user knows . What at debugging time ?

Personnaly I do not like this solution, because this involves the introduction of such illogicality . This is not safe and will perhaps conduce to a worst situation then not handling this .

Of course, it is possible to check only the corresponding parameters and not checking the other types .

if $n < m$ then $\forall$ i, $1 \leq i \leq n$ $D_i = D'_i$
if $n > m$ then $\forall$ i, $1 \leq i \leq m$ $D_i = D'_i$

for the $i \geq n$ in the first case
$i \geq m$ in the second case
} the other descriptions are not checked .

III . 2 . 2 . Partial conclusion .

There is no mean of handling this without giving some responsability to the conception of the replacing module .

There is also a problem of preserving the data base integrity .

III . 3 . At link time .

III . 3 . 1 . Introduction .

As mentioned at the formal definition of the problem, we have restricted us with the situation where all common part between formal and actual parameter must have the same description .

The reason why I have taken such restriction is because we must first have to accomplish the type checking (and it is yet no easy)

and after we must relax the constraints . This means that if we want to introduce fully the ability of dynamic interfaces, we must have to do no more checking . Indeed, how can a system decide in next situation :

```
call  P(A, B, C)                          Proc P(A", B")
      .
      .
      .
call  P(A', D', E')
```

If we say that we can link the modules together, how can we decide that the first call is correct and the second one contains an error . The only way, of knowing it, is when the programmer have interchange the old module with the new one . he (she) is responsable of the compatibility between the interfaces .

After all, what I have done is to force the interfaces to be checked precisely and if we want to relax too much constraints, we must no more be able to perform the checks .

III . 3 . 2 . Trouble of handling full dynamic interface ability .

For debugging purposes, it is also not so good that one can be able to replace an old module without advise . Indeed, if there is a dump, how can the user manage such situation .

There is also problem for preventing the use of parameter that does not exist when performing the old call . For example,

1)if the new program module is such that it needs give parameters, and if we must deal with such program :

Proc P (P_1, P_2, P_3, P_4, P_5)

$$Y = f(a,b) + (.....) * P_5$$

end .

If we must perform the old call, what can happen ? The P_5 has not receive any value . It will then have the value contained by the following bits of P_4 . This of course can lead to many trouble . We must remember that the old call performed does not know that the module have changed . He can thus have strings effect due to the change . I do not see any solution for this if we want the system to take account of this .

2) if the new program is only adding one function in a case, we have no problem in fact we will never perform the case of the new function .

old	new
Proc P(P_1, ... P_4)	Proc P(P_1, ... P_5)
case of P_1	case of P_1
case of P_2	case of P_2
case of P_3	case of P_3
case of P_4	case of P_4
	case of P_5
end case;	end case;
end P;	end P;

This of course is the good case but one reflexion comes directly to mu mind : Why adding this new function to the module instead of doing a new module with this function ?

III . 4 . Some_partial_conclusion .

I have decide that such situation can not fully be accomplish by the system at least not easily nor economically . For instance, the PLIOPT which in the PL/I compiler optimiser which can handle a part of such situation but at cost of 64 passes (not the whole program is examined but some part of coding).

But, I must provide at least some mechanism for helping the designers or programmers for handling such situation . This mechanism

should provide a way of testing wether the parameter is present or not . If it is present, it is tested . But, it is the responsability of the programmer to use it or to write his (her) coding keeping in mind the fact that it can be called with an old interface .

This will lead to such situation :

1)I use once again the example 1 in the previous section .

```
Proc P(P1, .... P5)                    Proc P(P1, .... P5)

Y = f(a,b) + ( ...) * P5   becomes      Y P5 then z = (...) * P5
                                            else z = 0
                                       Y = f(a,b) + z
end;                                   end;
```

2) Another kind of solution is :

```
Proc P (P1, .... P5)

if is present (P5) then

                else

end;
```

The practical way of doing this will be mentioned brievelly in the next part . But we can see that we are able to provide some help but we do not have a full practical mean to solve the dynamic interface fully .

III . 5 . Conclusion .

After many readings, after many meetings with people who are working in different society, I become to doubt of the necessity or the interest of solving such problem . In all cases, the problem of testing the interfaces is solved . We are now able to verify the correspondance of the definition between formal and actual parameters .

Another thing is that, if we permit the use of such ability, who are the people that can use such facility . If we do not force only

the people who needs it to use it, we have loose our aim . We must then once again give the responsability of doing this to some one . Indeed, if untrained people use this, th's will involve a worse situation than it is today where no checking is done for external procedure .

On advantage of not solving the whole is the fact that when a software is designed the coherence between modules will be enforced without human intervention .

I will then say that the partial solution we give is the best "compromis" between having a reliable system, a system usefull in practice (not too slow nor too space consumming) and a flexible system .

Part 4 : Implementation of a solution .

I . Type-checking implementation .

I . 1 . Description of type .

I . 1 . 1 . First possibility .

We can decide that we do not offer the handling of predefined type . This will say that we are only confronted with types like Integer, real, array and so on .

This solution is too restrictive because most languages offer more ability for type handling . We will not want to restrict the type definition ability .

Moreover, this will not solve the problem of handling records within which different name occur .

For instance,

t_1 = array [1 ... 10] of integer
t_2 = integer
r_1 = record { $i_1 : t_1$; $i_2 : t_2$ }
end ;

t_2 = array [1...10] of integer
t_3 = integer
r_3 = record { info 1 : t_2 ; info 2 : t_3 }
end ;

Are these record types equal ?

I . 1 . 2 . Second possibility .

We will now offer full ability for user type definition but the idea here is to expend the description fully until, we arrive to a predefined type . This do not solve the problem of the records as defined in I . 1 . 1 . and also do not solve the problem of the recursive type .

example 1

P1 : proc
t_1 = integer
t_2 = array [1...10] of t_1
x : t_2
call P2 (x)
end;

P2 : proc(y)
t_3 = integer
t_4 = array [1...10] of t_3
y : t_4
end;

Here, x type description will become (expanding the type) x = array [1... 10] of integer

y type description will become (expanding the type) y = array [1...10] of integer .

We can now do the check and see that they have the same type .

example 2 : When we deal with recursivity as it is defined in CLU and Pascal

CLU : List (T) = record [clt : T
rem : list (T)]

Pascal : t1 = record [clt : T
next : ↑t1]

This is called typed pointer . Here we can of course not do the expension because we enter in a infinite loop . How can we handle the next situation ?

box : record {info : t1
next ↑box

and box 1 = record {info 1 =t1
next 1 ↑box 1

I . 1 . 3 . Third alternative .

We can impose a global definition of types . This involves that the types are described, first, and then have to be used . This is may be too restrictive but this will may be have good effects on software engineering point of view . This lead to define a common description for all parts of a software .

For example : for an array, all people has to define them as :

. T_1 : array [1...m] of integer m defined as used
. T_2 : array [1...m] of real
and so on .

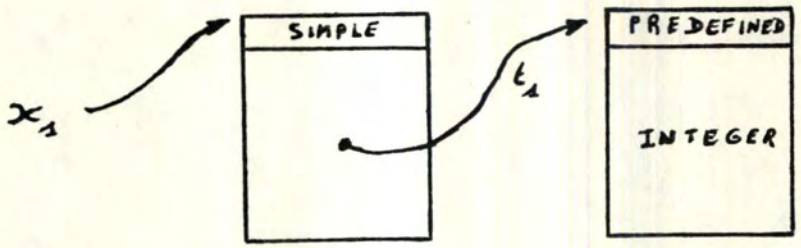
This means that all possible types that may be used by the software has to have the same description .

I . 1 . 4 . My solution .

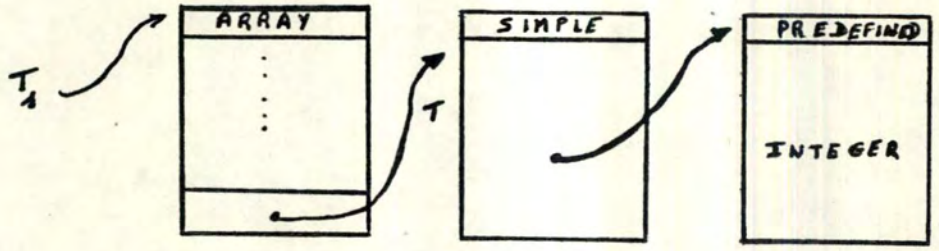
I would like to offer the full ability of user defined type definition. For showing what it means, I will give a complete example .

We test to see if we have a constructor we have a structure type, if not we have a simple type .

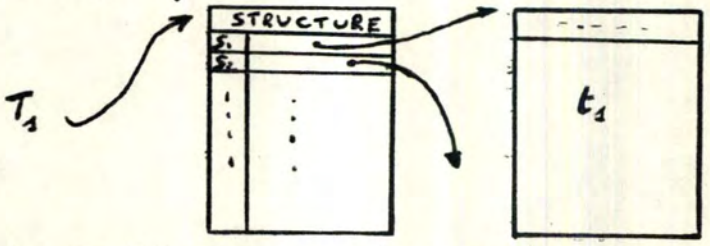
. t_1 : integer
x_1 : t_1



. T : integer
T_1 : array [e_1 : u_1, --] of T



. T_1 : record (s_1 : t_1, -- s_n : t_n)



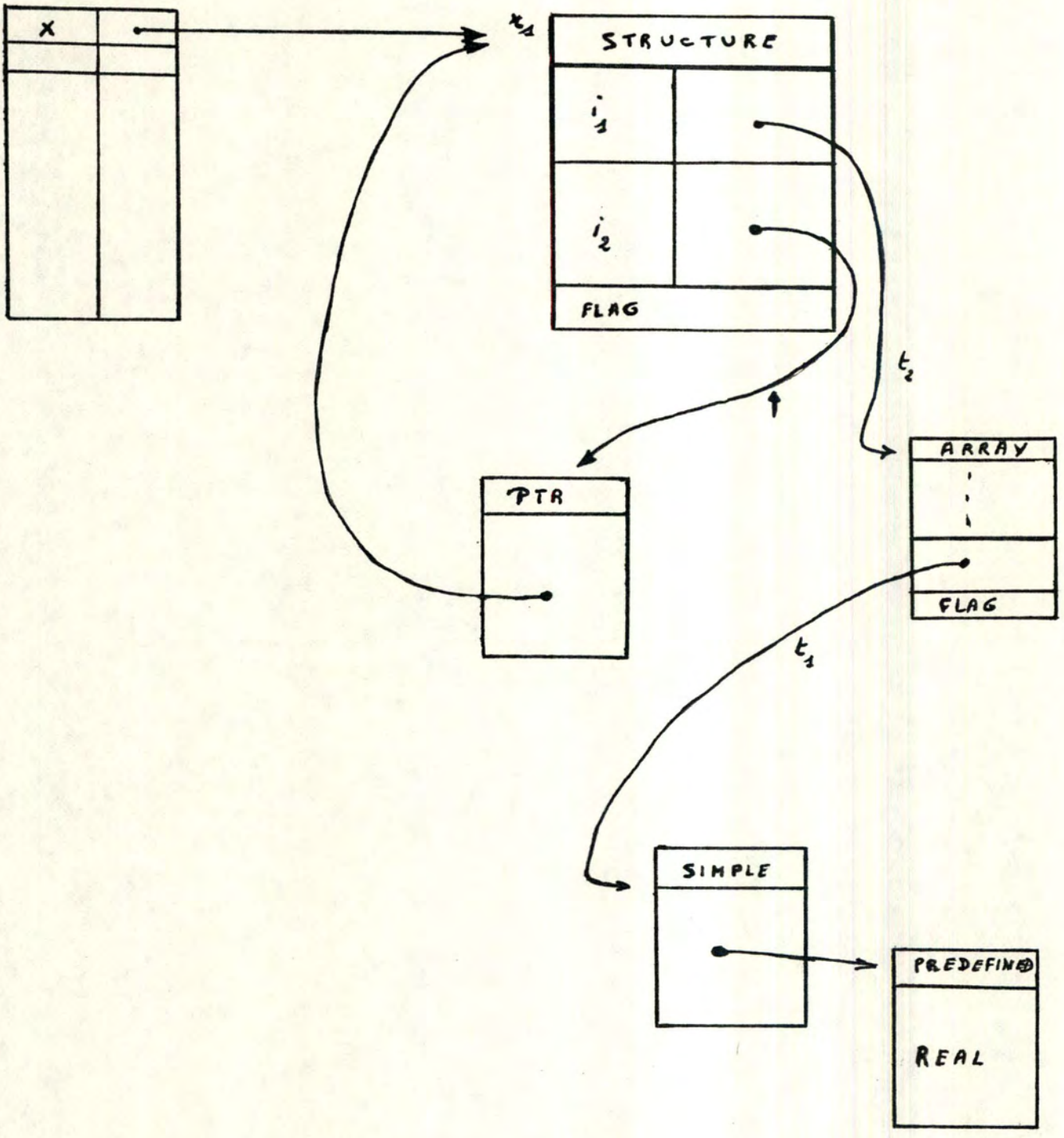
After defining this, I will show a complex example and how we can deal with it .

```
const m =2
type t1 = array [1 ... m] of t2
     t2 = real
     r1 = record {i1 : t1
                  i2 : ↑r1

x = r1
call P(x)
```

```
proc P(y)
const n = 2
type t3 = real
     t4 = array [1... n] of t3
     r2 = record {i1 : t3
                  i2 : ↑r2

y = r2
```



As shown, I have defined a type description which can accept recursion and all other features of user defined type .

The flag will serve when checking the correspondance for avoiding to detect the entering into an infinite loop .

I.2 Handling the check at link time.

I.2.I What is expected the compilers do?

First,as I mentioned in II.4.I.2,compilers and linkage editors should be modified to handle type checking at link time.

The compiler has to save informations about each external procedure call.

In this implementation,two files will be used :

File I : contains informations for each entry point

File 2 : contains informations for associated interface description

(for detailed layout,see fig I2.page 72)

Second,Iwill show what are the changes involved by the type checking at ESD cards generated by the compilers. (There is no other changes for all other kind of cards, the old format is given in figI3 a.page 73 and the new one in fig I3 b.page 73)

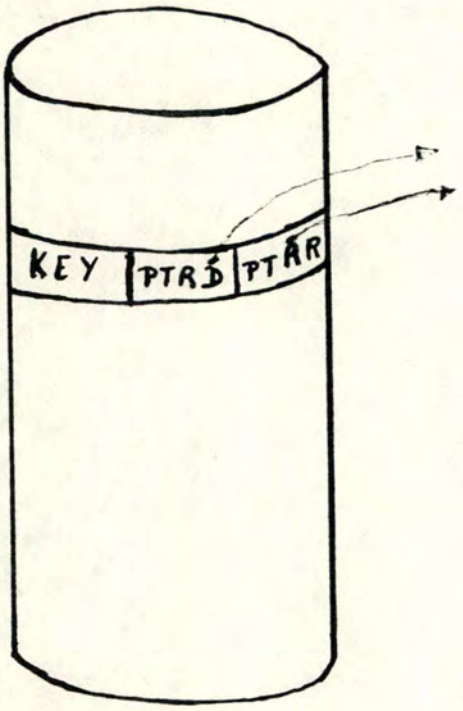
Before going further,I would like to give some remarks about the next figures.

In the figures,there will be two kinds of things : the existing situation what will be written in a quite thin way,the modifications will be written in a thick way.

In the figures,there will be several steps shown, each of them will have a number assiociated with each. These numbers will be used within the schemas.

Fig I2.

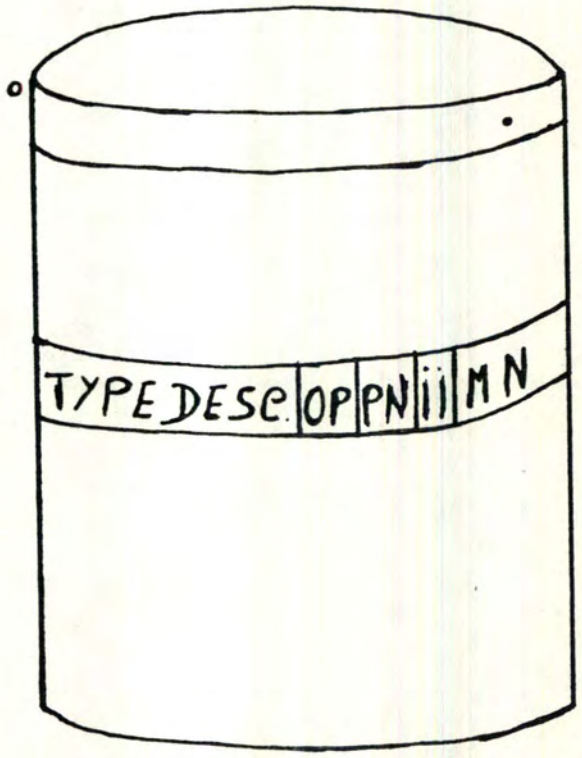
Keyed file



File DEF-REF

key : access-key = entryname
PTRD : pointer to definition(s)
of caller and callee
PTRR : pointer to references
to interfaces

Direct access file



File DESCRIPT

Typedesc : descriptor
of types
OP : overflow pointer
NP : next pointer
II : interface
indentifier
MN : module name
or
pointer to module code

Record 0 is the pointer
to the next free space

Remark : The OP field will never be used here, because it does not add anything for explaining the implementation but it would keep away the clarity of the schemas.

The OP field will be used if the interface description is too big for the place useful in the typedesc field of the descript file records.

Fig I3 a. Actual ESD Cards.

SYMBOL	TYPE	ID	ADDR	LENGTH	LDID	.....
P	ER	0002	..	..	..	

Fig I3 b. New ESD cards.

SYMBOL	INTID	CSECTNAME	NBRSTMT	TYPE	ID	ADDR	.....
P	I		5	ER	0002		

The symbols used here will be used in the next figures.

Third,I will show what are the actions performed by the compilers when encountering a procedure definition and when encountering a call.The associated algorithms are described in I.2.2.(see figure I4,page 75).

Fourth,I will show what are the actions performed by the compilers when encountering a procedure definition which is used in an other module as a subroutine.This will show how procedure definition are handled.The associated algorithms are described in I.2.2.(see figure I5,page 76).

Fifth,I will show what are the actions performed by the compilers when encountering more then one procedure with the same name(this is known as overloading).This will show how different procedures with the same name can be described without confusion.The associated algorithms are described in I.2.2.(see figure I6,page 77).

Fig I4.

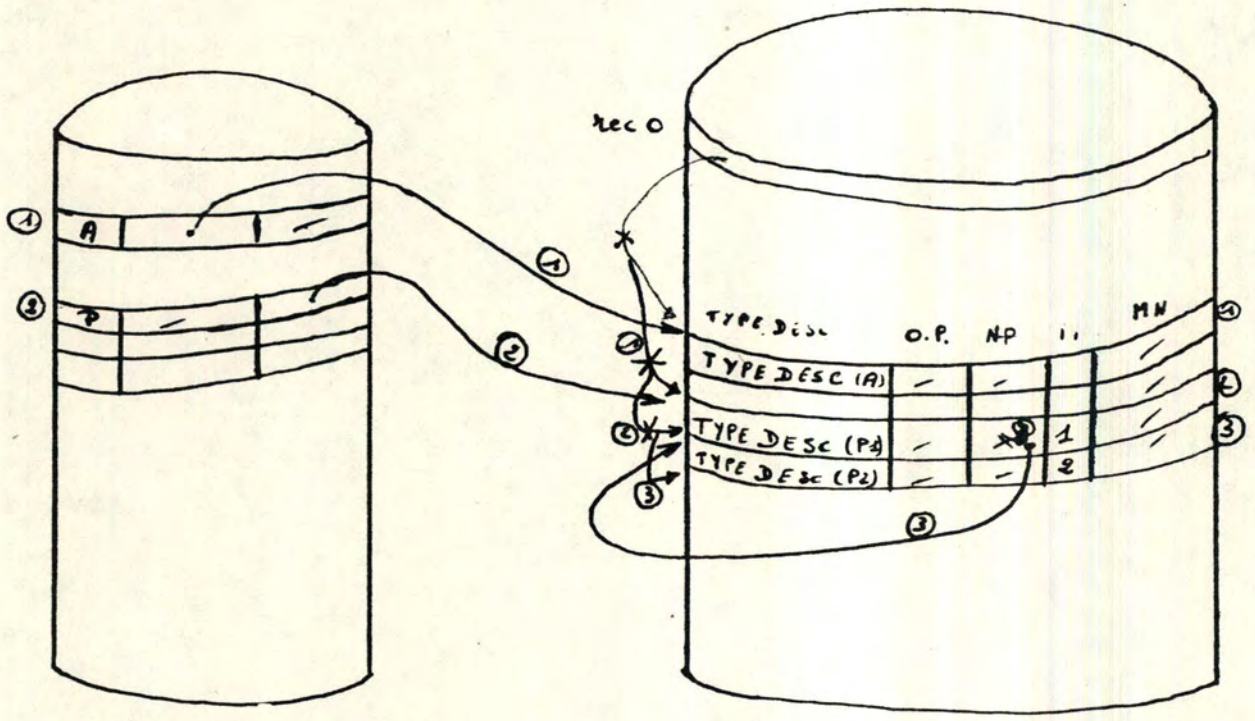
SOURCE

```
        Proc A (B,C,D)
          :
Line 5  Call P (E,F,G)
          :
Line I2 Call P (E',F')
          :
        End A;
```

Where A,B,C,D,E,F,G,P E',F' are supposed correctly defined.

OUTPUT OF THE COMPILER

```
ESD :  I  A    CM  000I     0000     002B
       2  P  I  ER  0002  5
       3  P  2  ER  0003  I2
TXT :     .
          .
          .
       L        I4,=V(PI)
       BALR     I4,I5
          .
          .
          .
       L        I4,=V(P2)
       BALR     I4,I5
          .
          .
          .
RLD :  000I ....
       0002 ....
       0003 ....
```



File DEFREF

File DESCRIPT

Fig I4.Explanation.

I.When encountering Proc A : ① The compiler looks in DEFREF file in order to see wether an entry exist with as key the entry name.Here,as it is supposed that we begin with a new situation,the compiler does not have such entry, then it creates one and store into the DEFREF file a record with the needed informations.After that,it stores the interface description into DESCRIPT file(after getting an entry in this file).

2.When encountering a first call as in line 5 :

② The compiler looks in DEFREF file,using the entry name as key,in order to see if the entry yet exist. Here of course,it does not exist.The compiler stores the needed informations into DEFREF file and gets an entry in DESCRIPT file and stores the informations in this file.The compiler updates the interface identifier and put it into the ESD card.

3.When encountering a call as in line I2 :

③ The compiler looks in DEFREF file,using the entry name as key,in order to see if the entry yet exist.Here, of course,the entry exists because it was yet created when compiling line 5.It takes the PTRR pointer to have the corresponding entry in DESCRIPT file.The compiler compares the interface description.If the descriptions are the same,the only thing to do is to put the interface number into the ESD card.If the descriptions are not equal the compiler gets a new entry in DESCRIPT file,updates the interface identifier number,stores the informations into the DESCRIPT file and generates a ESD card.

Fig I5.

SOURCE

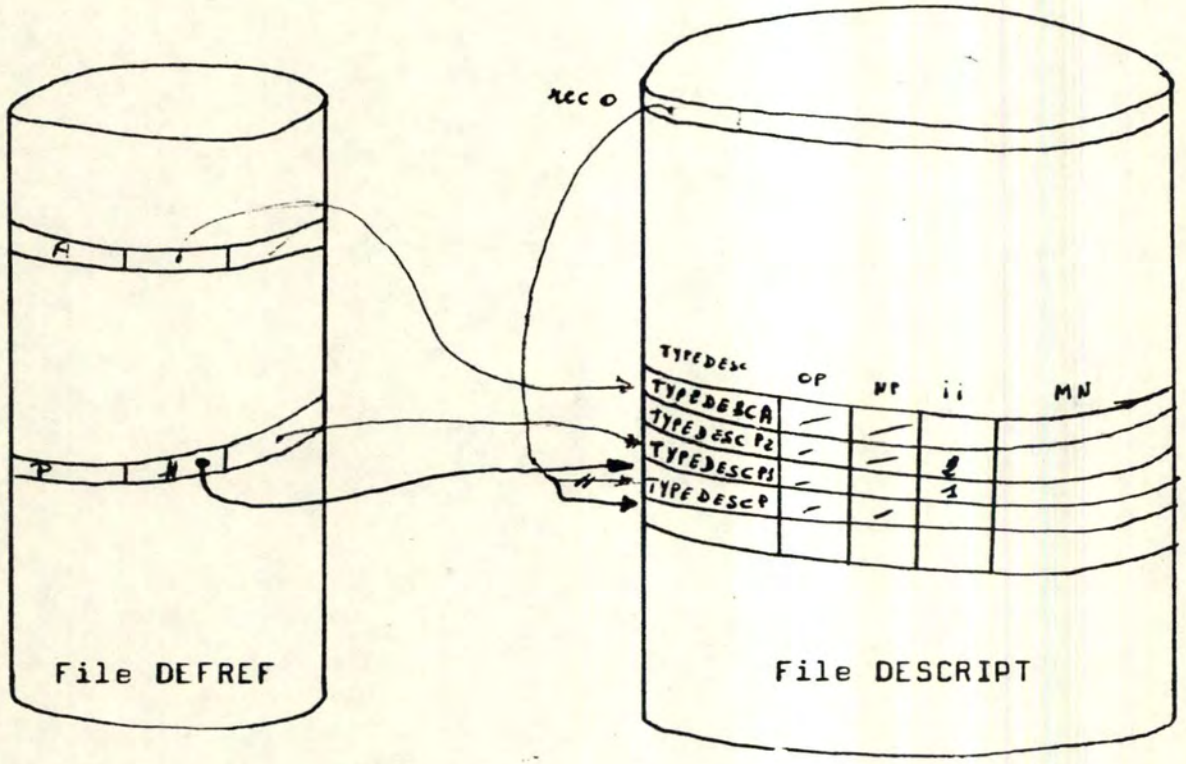
```
Proc P (A,B)
  :
  :
END P;
```

OUTPUT OF THE COMPILER

```
ESD :  P     CM     000I     000I   004C

TXT :        .  .  .  .  .
             .  .  .  .  .
             .  .  .  .  .

RLD :  000I
```



When the compiler compiles the procedure P,it looks in DEFREF file,using the entry name P as key,It finds then that the PTRD in this file is not used.The compiler gets an entry in DESCRIPT file and store in it the informations. The compiler update the PTRD pointer.

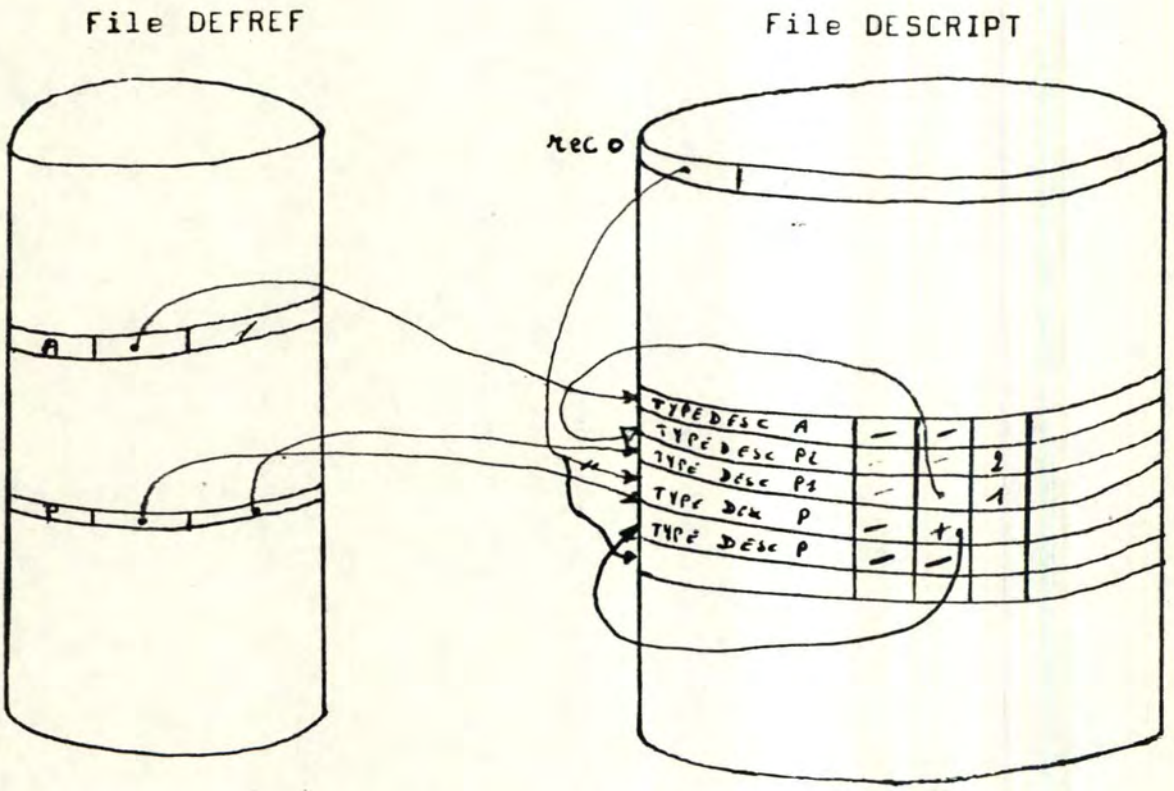
Fig I6.

SOURCE

```
Proc P (A,B,C)
  :
  :
END P;
```

OUTPUT OF THE COMPILER

```
ESD :  P     CM     0001     0000     0148
TXT :        .  .  .  .  .
             .  .  .  .  .
             .  .  .  .  .
RLD :  0001
```



When the compiler compiles the procedure P,it looks in DEFREF file,using the entry name P as key,It finds that the PTRD is yet in use.It gets then the corresponding entry in DESCRIPT file and compare the descriptions of the file and the descriptions under examination.If the descriptions are equal,then there is no special actions must be undertaken by the compiler.If the descriptions are not equal,the description under compilation is added in DESCRIPT file and the NP pointer of the existing record is updated.

I.2.2 General algorithms of the new compiler functions

In the next figures (Fig I7 a,b,c),I will show the general algorithms for handling a call.
There are three algorithms because the compilers have to handle three kinds of things.The first one is the management of the two files,the second is the generation of the ESD card and the third is the generation of the RLD card.The figures are in page 79.

The following figures (Fig I8 a,b),I will show the general algorithms for handling procedure header.
There are two figures because I will describe what happen at files level,that will say the consultation of both files,and what happen at ESD card level.The figures are in page 80.

I.2.3 What is expected the linkage editor do ?

I will describe shortely how the linkage editor uses the informations given by the compilers.For doing it, I will use the files described in fig I6 and show with it the actions taken by the linkage editor in order to provide the type checking.The figure and its explainations can be found in page 81 & 82. (see fig I9)

I.2.4 General algorithms of the new functions of the linkage editor

In the next figure (Fig 20),I will give the general algorithm for handling the type checking by the linkage editor.I will show how the informations given by the compilers are used by the linkage editor for doing it. the figure will be given in page 83.

FIG.I7a

```
Is the entryname within the reference list?

        Y ------> WORK.INTID  := DESCRIPT.INTID

        N ------> Is the list empty?

                      Y ---> WORK.INTID := 1 ;
                             DESCRIPT.INTID := 1;

                      N ---> WORK.INTID := LAST.INTID + 1;
                             DESCRIPT.INTID := WORK.INTID;

                    Add the reference into the reference list;
end;
```

FIG.I7b

```
GENERATION OF ESD CARDS.

   ESD.SYMBOL  := ENTRYNAME;
   ESD.INTID   := WORK.INTID;
   ESD.CSECT   := MODULENAME;
   ESD.STMTNBR  := SOURCELINENUMBER;

Nothing else have changed.
```

FIG.I7c

```
GENERATION OF RLD CARDS.

   if  ref does not exist into referencelist,
           then create a new RLD card
   endif;
```

FIG.I8a

Is the entryname within the DEFREF file?

Y -----→ DESCRIPT.TYPE.P is within type-desciptor-list?

Y --→ RETURN

N --→ Add the reference to the reference list;

N -----→ Add the key entryname and set the PTRD;
Add the definition in the definition list of DESCRIPT file;

end;

FIG.I8b

GENERATE ESD CARDS.

Do nothing else then actually done.

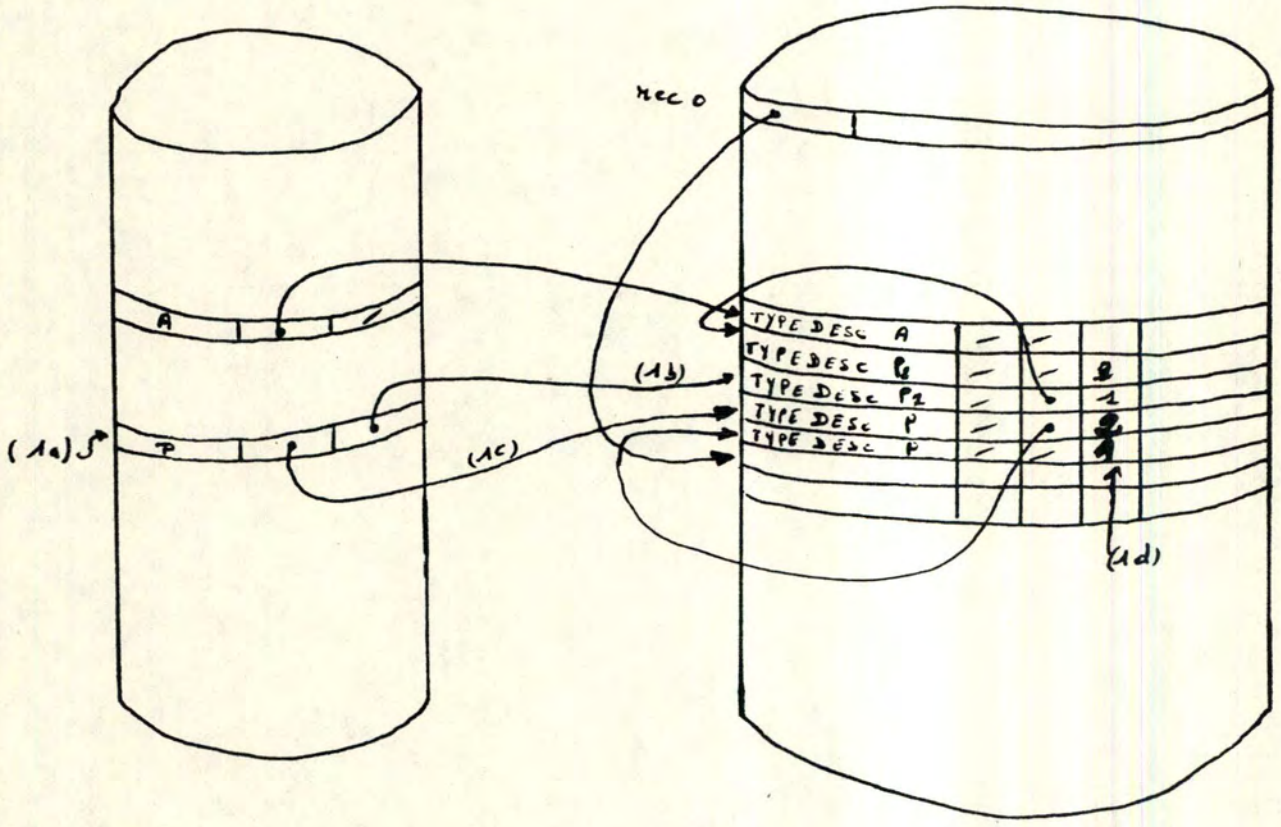
Fig I9.

- A link A instruction is given.
- The linkage editor takes the ESD cards of type ER of the compiled module A.
- For the other kinds of cards,nothing have changed.
- When it encounters the first ESD card P,it takes its II number and its entry name as key for accessing DEFREF file where it finds both pointers,one for the references and the other for the definitions.(1a)
- With the PTRR pointer,it goes through the reference list and when it finds the corresponding II,it stops the search through the list.(1b)
- With the PTRD pointer,it goes through the definition list and it test to see wether a II number is yet setted If it is the case,it compares the definition II and the reference II,if there are equal,no problem continue the link,if not go through the list.(1c)
- When the linkage editor encounters the corresponding description and when it is not yet encountered(no II value),it puts the II value of the reference in the corresponding field of definition record.(1d)
- If no corresponding description can be found,an error is flagged.
- This process must be also done,if the module P has some external references,for P.

Fig I9.

LINK A is the instruction given.

```
ESD : A      CM        000I   0000    002B        (output
      P  I   ER   A    0002 5                      of the
      P  2   ER   A    0003 I2                     compilers)
      P  I   ER   A    0004 I8    (line added for expla nations
                                   purposes)
          ..............
          ..............
          ..............
```



The symbols used here are the same that have been used in figure I4,I5 & I6,page 75,76,77.
The corresponding general algorithm can be found in figure 20 page 83.

FIG 20

```
For each ESD cards of type "ER"
    do
        find corresponding entry in reference list;
        if does not exist, then do
                                send error message to user;

                                enddo
                            else find same interface in definition lis
                                if does not exist then do
                                                    send error;

                                                enddo
                                            else do
                                                    take module-
                                                         name;
                                                    load this;

                                                enddo

                                endif

        endif
    enddo
```

I.3 Detailed algorithms

The figures showing these algorithms are in the following pages.The detailed algorithm corresponding to figure I7a, is shown in figure 2I page 85.

The detailed algorithm corresponding to figure I7b, (page 79) is shown in figure 22 page 86.

The detailed algorithm corresponding to figure I7c, (page 79) is shown in figure 23 page 87.

The detailed algorithm corresponding to figure I8a, (page 80) is shown in figure 24 page 88.

The detailed algorithm corresponding to figure 20, (page 83) is shown in figure 25 page 89.

I.4 Handling the dynamic interface.

As mentionned before,we are only concerned by the fact that the only dynamism,that we accept,handles a different number of parameters in a parameter list but we assume that there is no difference,at parameter type point of view,between the two lists.

The most easiest way for implementing it,is to modify the type checking algorithm for stopping the checks once a parameter list is completely examined.This modification will not change much of the algorithms described here,so I will not give a detailed way for implementing such thing.

I will mention that there is another way to do it.The alternative way of doing it,is to ask the linkage editor to continue the checks until all elements of the shortest parameter list were seen as correct.This has as consequences that the system will no more detect the cohesion of the actual parameter list and the formal one.It can only offer or guaranty that the common part of both parameter list have the same type.

It is left to the programmer the responsability of the validity of the old call(comparing it with the new ones). This is may be not what is wished by the people who are concerned by the maintenance or by the reliability of a software.

Fig 2I.

```
Defref_type = record [ Entryname : Char(8);
                       Defptr    : ↑ Descript_type;
                       Refptr    : ↑ Descript_type]
Descript_type = record [ Typedesc : Interface;
                         Typeop   : ↑ Descript_type;
                         Typenp   : ↑ Desccipt_type;
                         Intid    : Integer;
                         Modname  : Char(8) ]
Refbuf : Defref_type;
Descrbuf : Descript_type;
Out : Descript_type;
Outptr : ↑ Descript_type;
Workintid : Integer;

getfile DEFREF (entryname) into Refbuf;
if record not found then create an empty record with entryname;
endif
if Refptr = NIL then do
                       getfile DESCRIPT (0) into Descrbuf;
                       Refbuf.Refptr := Descrbuf.Nextfree;   / Nextfree is
                                                               a field only
                                                               inrecord 0 /
                       Descrbuf.Nextfree := Descrbuf.Nextfree + 1;
                       putfile DESCRIPT (0) from Descrbuf;
                       putfile DEFREF (entryname) from Refbuf;

/ We have just updated the pointer to the next free record in DESCRIPT
  file and also updated the pointer to the references in DEFREF file /

/ The next few lines create the new Descript record and written it
  in the DESCRIPT file /

                       Descrbuf.Typedesc := convert (interface);
                       Descrbuf.NP := NIL;
                       Workintid := 1;
                       Descrbuf.Intid := 1;
                       Decrbuf.Modname := ∅;
                       putfile DESCRIPT (Refbuf.Refptr) from Descrbuf;
                    enddo

/  convert is a primitive of the system for transforming the source
   description of the interface in the internal one.  /
```

```
                else do
                        getfile DESCRIPT (0) into Descrbuf;
                        Refbuf.Refptr := Descrbuf.Nextfree;
                        Descrbuf.Nextfree := Descrbuf.Nextfree    I;
                        putfile DESCRIPT (0) from Descrbuf;
                        Out.NP := Refbuf.Refptr;
                        putfile DESCRIPT (Outptr) from Out;

/ We have just updated the pointer to the next free record in
  DESCRIPT file and also updated the pointer to the next reference
  of the reference list in DESCRIPT file . /

/ The next few lines create the new Descript record and written
  it in the DESCRIPT file. /

                        Descrbuf.Typedesc := convert (interface);
                        Descrbuf.NP := NIL;
                        Workintid := Out.Intid + 1;
                        Descrbuf.Intid := Workintid;
                        Descrbuf.Modname := ∅;
                        putfile DESCRIPT (Refbuf.Refptr) from Descrbuf;
                      enddo
endif
```

Fig 22.

```
ESD_type = record [ Symbol : Char(8);
                    Intid  : Integer;
                    Csectname : Char(8);
                    Nbrstmt : Integer;
                    Type    : Char(8);
                    Id      : Integer;
                    Addr    : Integer;
                     .  .  .  .  .  .
                     .  .  .  .  .  .
                     .  .  .  .  .  . ]
```

/ The rest of the ESD_type has not changed,this is the reason why it is not described here nor will be described the existing code for managing it.The only thibgs that are described are those which are not yet handled. /

```
ESD : ESD_type;


ESD.Symbol := Entryname;
ESD.Intid  := Workintid;
ESD.Csectname := Source.Modulename;
ESD.Nbrstmt := Source.Linenumber;
ESD.Type :="ER";

.   .   .   .   .
.   .   .   .   .
.   .   .   .   .
```

/ There is no other changes,so I will not give more details. /

Fig 23.

```
if is_in_list (interface,Refbuf.Refptr,Out,Outptr) then do noop

                                                    else do
                                                           create a RLD card
                                                         enddo

endif
```

/ As there are no changes in the treatement of the RLD cards,I will not give any additional details. /

/ The is_in_list is a primitive of the system which provides two things.First,if the first parameter is in the list of the Descript record list pointed by the Refbuf.Refptr,the primitive returns in the Outptr parameter,the pointer to the record where the match was found,in the Out parameter,the contains of the record where the match was found.

Second,if the first parameter is not in the list of the Descript record list pointed by the Refbuf.Refptr,the primitive returns in the Out parameter,the value of the highest Intid used until now.There is no more information needed because we can use the Nextfree pointer of record 0. /

Fig 24.

```
Defref_type = record [ Entryname : Char(8);
                       Defptr    :   Descript_type;
                       Refptr    :   Descript_type]
Descript_type = record [ Typedesc  :   Interface;
                       Typeop    :   ↑ Descript_type;
                       Typenp    :   ↑ Descript_type;
                       Intid     :   Integer;
                       Modname   :   Char(8) ]
Refbuf : Defref_type;
Descrbuf : Descript_type;
Out : Descript_type;
Outptr : ↑ Descript_type;
Workintid : Integer;

getfile DEFREF (entryname) into Refbuf;
if record not found then create an empty record withentryname;
endif
if Defptr = NIL then do
                       getfile DESCRIPT (0) into Descrbuf;
                       Refbuf.Defptr := Descrbuf.Nextfree;
/Nextfree is a field that exists only in record 0 and is a pointer
 to the next free record in the DESCR IPT file. /
                       Descrbuf.Nextfree := Descrbuf.Nextfree + 1;
                       putfile DESCRIPT (0) from Descrbuf;
                       putfile DEFREF (entryname) from Refbuf;
/ We have just updated the pointer to the next free record in DESCRIPT
  file and also updated the pointer to the definitions in DEFREF file./

/  The next few lines create the new Descript record and written it
   in the DESCRIPT file. /
                       Descrbuf.Typedesc := convert (interface);
                       Descrbuf.Typenp := NIL;
                       Workintid := 1;
                       Descrbuf.Intid := Workintid;
                       Desccbuf.Modname := Catalogued_name;
                       putfile DESCRIPT (Refbuf.Defptr) from Descrbuf;
                     enddo
/  convert is a primitive of the system for translating the source
```

Fig 24.

interface description in an other one more useful and easier to handle. /

```
                else do
                        getfile DESCRIPT (0) into Descrbuf;
                        Refbuf.Defptr := Descrbuf.Nextfree;;
                        Descrbuf.Nextfree := Descrbuf.Nextfree    I;
                        putfile DESCRIPT (0) from Descrbuf;
                        Out.Typenp := Refbuf.Defptr;
                        putfile DESCRIPT (Outptr) from Out;
/ Wehave just updated the pointer to the next free record in
  DESCRIPT file and also updated the pointer to the next definition
  of the definifion list in DESCRIPT file . /

/ The next few lines create the new Descript record and written
  it in the DESCRIPT file. /

                        Descrbuf.Typedesc := convert (interface);
                        Descrbuf.Typenp := NIL;
                        Workintid := Out.Intid + 1;
                        Descrbuf.Intid := Workintid;
                        Descrbuf.Modname := Catalogued_name;
                        putfile DESCRIPT (Refbuf.Defptr) from Descrbuf;
                      enddo
endif
```

Fig 25.

```
ESD_type = record [ Symbol : Char(8);
                    Intid  : Integer;
                    Csectname : Char(8);
                    Nbrstmt : Integer;
                    Type    : Char(8);
                    Id      : Integer;
                    Addr    : Integer;
                    . . . . . .
                    . . . . . .
                    . . . . . . ]
Defref_type = record [Entryname : Char(8);
                      Defptr    : ↑ Descript_type;
                      Refptr    : ↑ Descript_type]
Descript_type = record [ Typedesc : Interface;
                         Typeop   : ↑ Descript_type;
                         Typenp   : ↑ Descript_type;
                         Intid    : Integer;
                         Modname  : Char(8) ]

Out : Descript_type;
Out1 : Descript_type;
Refbuf : Defref_type;
Descrbuf : Descript_type;
ESD : ESD_type;
Outptr : ↑ Descript_type;
Out1ptr : ↑ Descript_type;

for each ESD.Type = "ER" do
                        getfile DEFREF (ESD.Symbol) into Refbuf;
                        if record not found
                           then do
                                  send errormsg1
                                enddo
                           else do
```

Fig 25.

```
            if is_in_list (ESD.Intid,Refbuf.Refptr,Out,Outptr)
               then do
                 if is_in_list (Out.Typedesc,Refbuf.Defptr,Out1,Out1ptr)
                    then do
                           Out1.Intid := Out.Intid;
                           putfile DESCRIPT (@Out1ptr) from Out1;
                           load OutI.Modname;
                           . . . . . .
 / Here should be done the current treatement /
                         enddo
                    else do
                           send errormsg2
                         enddo
                 endif
              else do
                     send errormsg3
                   enddo
            endif
          enddo
     endif
  endfor
```

Exemple of error message

```
  errormsgI := "CALL FROM LINE ESD.Nbrstmt ESD.Symbol DOES NOT EXIST !"

  errormsg2 := "CORRESPONDING DEFINITION FOR THE REFERENCE ESD.Symbol
               CALLED IN LINE ESD.Nbrstmt IN ESD.Csectname DOES NOT
               NOT EXIST !"

  errormsg3 := "REFERENCES OF ESD.Symbol CALLED IN LINE ESD.Nbrstmt
               HAVE BEEN DELETED SINCE LAST RUN !".
```

2.Conclusions of part 4.

As described within the algorithms and the file description I have taken most of the practical details as ESD cards from IBM machines.This is not because they are better but only because I have many manuals from IBM and that it was easy to find informations about their systems.Here most of the deteils were taken from their VM370 system.In all cases,the functions of such parts of the operating system like linkers,compilers and loaders are the same even with other systems,even they differ in the way of doing it.

These are the reasons why I have taken such decision.

As it can be shown ,the solution adopted here can also be done even with fetches.The only modification that must be done is the fact that the compilers must no more address the library of load modules but the library of executable module for having the coding.

There are also two possibilities for accessing the load modules. The first one,is to introduce no changes to the operating system for handling the code of the load module.This involves that the name of the module catalogued must be directly put into the record that describes the interfaces.

The second one,is to put directly an access to the module code to the same record.The first possibility will perhaps see as better because there are no changes and then,the old ways are compatible with it.

Part 5 : Conclusion .

At this point, I have to mention that as it is the evolution today, to write in high level language and to separate a software into pieces, the interface description is important .

When designing a software, the first part of the job is to define precisely what are the requirements of the software . The second part is to establish all the interfaces in order to be able to give some module to all people working on the project . The third one, is to implement the functions . While implementing them, the program only refer them selves to the interfaces as defined earlier . If some interfaces are changed, may be a lot of module should also change .

What this thesis solve in two things :

1)Type checking : We are now able to construct systems that can check the correspondance between the type definition as done in the caller and the callee program . This inforce the reliability of the system because no misconception nor ambiguities at interface level can be passed without be flagged .

This is done at a low price and at quite no execution price what is the most important . It has no difficult or special handling of fils . It does not mean to change any logic of the operating system . I have only add for the compilers the duty of copying some part of the table they handle and for the linkage editor the type checking .

These modifications are easy to implement and will involve very strong assurance of having fully coherent interfaces of the software .

2)Variable interface : We can now use different interfaces . Not all cases are handled, but the most common flexibility wanted . This ability is adding a function to the module and replacing the old by the new or suppress a function to the module and replacing the old by the new .

As interfaces can be seen as specifications of modules or as the functionality of the modules, if we permit to change them in any way, this will increase the software crisis what is not our aim.

Indeed, if the interfaces have to change too often or too completely, is it not the symptom that the software was not understand (requirements point of view) . This also will not better to reconstruct logically the whole software first . I think that if this happen, it is the symptom that it is better to stop, to reconstruct logically the whole, to redefine the interfaces in a convenient way and after that to redistribute the work .

As this work have been done with the idea of no changing the whole existent software such operating systems, this involves that the solution found will may be not be theoretically elegant or that there is no other solution . In fact, it should be possible to construct operating system that lead to totaly different considerations and which can handle the checking directly as a requirement, but for doing this I would need a few years and not only a few month .

My hope is that this thesis will serve as means for helping in solving the software crisis just a little . If this is the case or if this will serve anyone in its work, than I think that this thesis was fruitfull .

INSTITUT D'INFORMATIQUE
FNDP NAMUR

ABOUT DYNAMIC INTERFACES TODAY

(ANNEXES)

MEMOIRE PRESENTE PAR
OLIVIER STAES
EN VUE DE L'OBTENTION
DU DIPLOME DE
LICENCIE ET MAITRE
EN INFORMATIQUE

ANNEE ACADEMIQUE
1984/85

GLOSSARY

GLOSSARY

Actual parameter : parameter which definition is done in the caller program . It is not seen here as the value of the parameter at execution .

Compiler : Software that translates a program from a high level language into machine language .

Completeness : the degree to which a program can handle input variants .

Correctness : the degree to which a program matches its specification .

Database : a set of structured data used for a variety of purposes .

Debugging : location and fixing an error in a program .

External procedure : is a procedure (subroutine or function) defined "after" another procedure but which can be involved by the others . Here, when dealing with it, we mean procedure that are compiled separetely from the caller . These procedures are then concerned by this thesis .

Formal parameter : parameter which definition is done in the caller program . It is not seen here as the value of the parameter at execution time .

High level language : programation language near the logical information or mathematical one . Must be translated into a machine code by a program called compiler .

Internal procedure : can be subroutine or function . It is called internal because these programs will be compiled together .

Module : the basic functional unit of a program . Modules are designed added and tested separetely .

Overloading : is using two times or more a same symbol . This symbol can represent a function call, an operator definition as "+" . These symbols can be distinguish by the objects type or the number of objects they can manipulate .

Specification : of software is a way of hiding information and post-passing implementation decision . Here, I use specification as a mean of defining precisely the software such that both user and designer can discuss each other in an unambiguous way .

REFERENCES

Debugging

Bats P. C. & all : An Approach to High Level Debugging of Distributed System
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)
: High Level Debugging of Distributed System
in The Journal of System and Software, vol 3 n° 4 (Dec 1983)

Beander : Van debug : An Interactive, Symbolic, Multilingual Debugger
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Blain J. : Extendable non Interactive Debugging

Brugger B. & all : Generalized Path Expression : A High Level Mechanism
in The Journal of System and Software, vol 3 n° 4 (Dec 1983)

Briands & all : Development of a Debugger for Concurrent Language
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Cargill T. A. : The Blit Debugger
in The Journal of System and Software, vol 3 n° ' (Dec 1983)

Clarcke, Richardson : The Application of Error - Sensitive Testing Strategics to Debugging
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Coak, Ler : Dymos : A Dynamic Modification System
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Cordell : Multilingual Debugging with the SWAT High Level Debugger
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Elliot B. : A High Level Debugger for PL/1, Fortran & Basic
in Software Practice & Experience, vol 12 (1982)

Ferrante : High Level Debugging with a Compiler
in Software Practice & Experience, vol 12 (1982)

Fritzon P. : A Systematic Approach to Advanced Debugging through incremental compilation
in Software Practice & Experience, vol 12 (1982)

Fritzon P. : Symbolic Debugging through Incremental Compilation in an Integrated Environment
in The Journal of System and Software, vol 3 n° 4 (Dec 1983)

Gentleman W. M. & Haeksma H. : Hardware Assisted High Level Debugging
in The Journal of System and Software, vol 3 n° 4 (Dec 1983)

Gliksman R. : Criteria for a Debugging Language

Hamelot : Debugging "Level" : Step Wise Debugging
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Hill C.R. : A Real Time Microprocessor Debugging Technics
in ACM Sigsoft (Jul 1983)

Johnson J.D. & Kenney G.W. : Implementation Issues for a Source Level Symbolic Debugger
in ACM Sigsoft (Jul 1983)

Kishimoto : An Experimental Debugger in a Limited Programming Environment
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Kulzrad M. E. : Extending the Interactive Debugging System Helper

Müllerburg : The Role of Debugging within Software Engineering Environment
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Henstein O. : High Level Debugging Assistance via Optimizing Compiler Technology
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Powell M. L. & Linton M. A. : A Data Base Model of Debugging
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Sedlmeyer R. L. & all : Knowledge Based Fault Localization in Debugging
in The Journal of System and Software, vol 3 n° 4 (Dec 1983)

Seidmer & Tindall : Interactive Debug Requirements
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Supnik R. M. : Debugging under Simulation

Tisher & all : Static Analysis of Programs as an Aid to Debugging
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Walter : DELTA : A Universal Debugger for CP 6
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Weber : Interactive Debugging of Concurrent Programs
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Witscharsk C. A. : The Real Time Debugging Monitor for the Bell System 1A
in Software Practice and Experience, vol 13 (1983)

Zellweger : An Interactive High Level Debugger for Control Flow Optimized Programs
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

Testing

Elmendorf W. R. : Disciplined Software Testing

Foster K. A. : Comment on "The Application of Error Sensitive Testing Strategies to Debugging"
in ACM Sigsoft Engineering Notes, vol 8 n° 5 (Oct 1983)

Ginzberg G. : Notes on Testing Real Time System Programs
in IBM System Journal, vol 4 n° 1 (1965)

Heuermann C. A. & all : Automated Test and Verification
in IBM Technical Disclosure Bulletin, vol 17 n° 7 (Dec 1974)

Heuermann C. A. & all : Automated Test with Interface Verification Simulation
in IBM Technical Disclosure Bulletin, vol 17 n° 7 (Dec 1974)

Heuermann C. A. & all : Verification of Test Case Output
in IBM Technical Disclosure Bulletin, vol 17 n° 7 (Dec 1974)

Jard C. & Bochmann G. V. : An Approach to Testing Specifications
in ACM Sigsoft/Sigplan : Symposium on High Level Debugging (1983)

King N. J. : Testing Conversional Systems

Myers G. : The Art of Software Testing
A Wiley Interscience Publication (1978)

Taylor R. N. : An Integrated Verification and Testing Environment
in Software Practice and Experience, vol 13 (1983)

Used for Solving the Problem

Ancona M. & all : Integrating Library Modules into Pascal Programs
in Software Practice and Experience, vol 14 (May 1984)

Andrews G. R. : An Alternation Approach to Arrays
in Software Practice and Experience, vol 12 (1982)

Beech D. : Modularity of Computer Languages
in Software Practice and Experience, vol 12 (1982)

Booch G. : Software Engineering with ADA
in Benjamin/Cunnings Publication (1983)

Briggs J. S. : Two Implementations of the ADA Program Library
in Software Practice and Experience, vol 14 (May 1984)

Hennesay J. & Elmquist M. : The Design and Implementation of Parametric Types in Pascal
in Software Practice and Experience, vol 12 (1982)

Holdevorth D. : A System for Analysing ADA Programs at Run Time
in Software Practice and Experience, vol 13 (1983)

King J. : A Verifying Compiler

Knuth E. : Software Structuring : A Pragmatic Approach
in Lecture Notes in Computer Science : Specification and Design of Software Systems Conference 82 . Springer Verlag (1983)

Kowalkowski T. : Parameter Passing Mechanisms and Run Time Data Structures
in Software Practice and Experience, vol 11 (1981)

Kozma L. & Laborczi L. : An Implementation Problems of Shared Abstract Data Types
in Lecture Notes in Computer Science : Specification and Design of Software Systems Conference 82 . Springer Verlag (1983)

Kriskensen : Syntax-Directed Program Modularization in Integrated Interactive Computing System
ECICS

Mateti : "Pascal" Verçus "C" : a Subjective Comparison
in Lecture Notes in Computer Science : Language Design and Programming Methodology . Springer Verlag (1980)

Meyer B. : Principles of Package Design
in CACM, vol 25 n^{r} 7 (Jul 1982)

Parnas D. L. : A Technique for Software Module Specification with Examples
in Communication of ACM, vol 15 n^{r} 5 (may 1972)

Richardson : A Critique of Module
in Lecture Notes in Computer Science Language Design and Programming Methodology . Springer Verlag (1980)

Robinson : The Design of a Successor to Pascal
in Lecture Notes in Computer Science Language Design Programming Methodology . Springer Verlag (1980)

Sale A. H. J. : Forward Declared Procedures; Parameter-lists and Scape
in Software Practice and Experience, vol 11 (1981)

Shaw : The Logical Design of Operating Systems (1974)

Stroustup B. : Adding Classes to the "C" Language
in Software Practice and Experience, vol 13 (1983)

Stroustup B. : "Long Return" : A Technique for Improving the efficiency of Inter Module Communication
in Software Practice and Experience, vol 11 (1981)

Tsin Y. M. : Extending the Power of Pascal's External Procedure Mechanism
in Software Practice and Experience, vol 12 (1982)

Wallis P. J. L. : Handling Type Information when Compiling Language with User Defined Types
in Software Practice and Experience, vol 11 (1981)

Welsh & all : A comparison of two Notations for Process Communication
in Lecture Notes in Computer Science : Language Design and Programming Methodology . Springer Verlag (1980)

Welsh & all : Pascal Plus - Another Language for Modulor Multiprogramming
in Software Practice and Experience, vol 9 (1979)

Wirth : The Module : A system Structuring Facility in High Level Programming Language
in Lecture Notes in Computer Science : Language Design and Programming Methodology . Springer Verlag (1980)

Maintainance

Aron : The Program Development Process (vol I & II)
Addison Wesley (1983)

Baber : Software Reflected
North Holland (1982)

Bauer & all : Towards a Large Spectrum Language to Support Program Specification and Program Development
in Lecture Notes on Program Construction . Springer Verlag(1978)

Bauer : Program Development by Stepwin Transformations
in Lecture Notes on Program Construction . Springer Verlag(1978)

Bauer : Systematics of Transformation Rules
in Lecture Notes on Program Construction . Springer Verlag(1978)

Bauer : Special Transformation Techniques
in Lecture Notes on Program Construction . Springer Verlag(1978)

Bachm & all : Characteristics of Software Quality
North Holland (1978)

Brooks : The Mythical Main Month
Addison Wesley (1975)

Chambers J. M. : Evolution and Maintainance are both Semantically insoud
in ACM Sigsoft Engineering Notes, vol 3 n^{r} 3 (Jul 1983)

Chapin N. :Software Maintainance with Four Generations Languages
in ACM Sigsoft Engineering Notes, vol 3 n^{r} 5 (Jan 1984)

Couger : Evolution of Business Systems Analysis Techniques
in Writings of the Revolution. Yourdon (1982)

Darlington : A System which Automatically Improves Programs
in Programming Methodology. Springer Verlag (1978)

De Balbine : Beller Manpower Utilization Using Automatic Restructuring
in Writings of the Revolution.Yourdon (1982)

Dershowitz : The Evolution of Programs
Brichtrouses Boston (1983)

Deutsch M. S. :Software Verification and Validation . Realistic Project Approach
Prentice Hall (1982)

Donelson: Project Planning and Control
in Writings of the Revolution. Yourdon (1982)

Dunn, Ulmann : Quality Assurance for Computer Software
Mc Growhill (1982)

Fagan : Design and Cods Inspections in Reducing Errors in Program Development
in Writings of the Revolution. Yourdon (1982)

Fox : Software and its Development
Printice Hall

Hatstead : Toward a Theorical Basis for Estimating Programming Effort
in Writings of the Revolution. Yourdon (1982)

Jones : Measuring Programming Quality and Productivity
in Writings of the Revolution. Yourdon (1982)

Martin & Estrim : Models of Computations and Systems
in Writings of the Revolution. Yourdon (1982)

Partsch : Examples for Change of Types and Object Structures
in Lecture Notes on Program Construction (1978)

Putmann & Fitzimmens : Estimating Software Casts
in Writings of the Revolution. Yourdon (1982)

Randell : System Structure for Software Fault Tolerance
in Programming Methodology. Springer Verlag (1978)

Sidner, Uittal : Knowledge Representation Tools for the Design , Training and Use of Information System
in Integrated Interactive Computing System (ECICS)

Van Tassel : Program Style, Design, Efficiency, Debugging and Testing
Printice Hall (1978)

Walstone & Felix : A Method of Programming Measurement and Estimation
in Writings of the Revolution. Yourdon (1982)

Walberg R. : Conversion of Computer Software
Printice Hall (1982)

General references

Attardi : Extending the Power of Programming by Examples
in Integrated Interactive Computing Systems ECICS

Balog K. & all : Software Development in LDM
in Lecture Notes in Computer Science Specification and Design of Software System . Springer Verlag (1983)

Barnard : Experiences with Building a SoftwareFramwork for Interactive System
in Integrated Interactive Computing System ECICS

Barnes J. C. : An Overview of ADA
in Software Practice and Experience, vol 10 (1980)

Barra & Dahl O. J. : A Portable Toolbox for Observation of Simula Execution
in ACM Sigsoft/Sigplan Symposium on High Level Debugging (1983)

Bates : A Case Study of a Methode for Determing the Necessary Characteristics of a Natural Language Interface
in Integrated Interactive Computing Systems ECICS

Baner : Detailization and Lazy Evaluation, Infinite Objects and Pointer Representation
in Lecture Notes Program Construction.Springer Verlag (1978)

Belady and Lehman : A Model of Large Program Development
in Writing of the Revolution.Yourdon Press (1982)

Bevan : The Design of User-friendly Systems for generating Intelligent Dialogues
in Integrated Interactive Computing Systems ECICS

Bird R. : Programs and Machines
in Wiley - Interscience Publication(1976)

Blank & all : Software Engineering : Methods and Techniques
John Wiley & Sons(1983)

Bochmann : Concepts for Distributed Systems Design(1983)

Bochm B. W. & all : A Primer in Structured Design
North Holland(1978)

Bochm B. W. : Software and its Impact
in Writing of the Revolution.Yourdon Press (1982)

Boyer R. S. & Strother Moore J. : Program Verification Prize
in Software Practice and Experience, vol 8 n^{r} 3 (Jul 1983)

Boyer R. S. & Strother Moore J. : The Correctness Problem in Computer Science
Academic Press (1981)

Braun C. L. : ADA : Programming in the 80's
in Computer Journal IEEE (1981)

Brender R. F. & all : What is ADA?
in Computer Journal IEEE (1981)

Brooks F. P. : The Mythical Man-Month
Addison Wesley (1975)

Brooks F. P. : The Mytical Man-Month Revisited
in ACM Sigsoft Software Engineering Notes, vol 7 n° 2 (April 82)

Broy : Semantics of Nondeterministics and Noncontinuous Constructs
in Lecture Notes, Program Construction. Springer Verlag (1978)

Buxton : Software Engineering
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Cardelli : Two-dimensional Syntax for Functionnal Languages
in Integrated Interactive Computing Systems ECICS

Carlson W. E. : ADA : A Promising Beginning
in Computer Journal IEEE (June 1981)

Chrustonsen K. & all : A Perspective on Software Science
in IBM System Journal, vol 20 n° 4 (1981)

Cointe : A VLISP Implementation of SMALLTALK -76
in Integrated Interactive Computing Systems ECICS

Cooper : Böhm and Jacopini's Reduction of Flow Charts
in Writing of the Revolution. Yourdon Press (1982)

Costello S. H. : Software Engineering under Deadline Pressure
in ACM Sigsoft Software Engineering Notes, vol 9 n° 5 (Oct 1984)

Crinc : PDL - A Toolfor Software Design
in Writing of the Revolution. Yourdon Press (1982)

Dahl O. J. : An Approach to Correctness Proofs for Semi Corountines
in Programming Methodology (IFLP WG 2-3). Spinger Verlag (1978)

Dahl O. J. & Dijkstra E. W. : Structured Programming
Academic Press (1975)

Davis W. S. : System Analysis
Academic Press (1983)

Diaz Herrera J. L. : Pragmatic Problem with Stepwise Refinement Program Development
in Software Practice and Experience, vol 9 n^{r} 2 (April 1984)

Dijkstra E. W. : A More Formal Treatment of a Less Simple Example
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : Stationary Behaviour of Same Ternary Networks
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : Finding the Correctness Proof of a Concurrent Program
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : On the Interplay Between Mathematics and Programming
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : A Theorem About Add Powers of Odd Integers
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : In Honour of Fibonacci
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : On the Foolishness of Natural Language Programming
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : Program Inversion
in Lecture Notes, Program Construction . Springer Verlag(1978)

Dijkstra E. W. : The Humble Programmer
in Programming Methodology (IFLP WG 2-3). Springer Verlag(1978)

Dijkstra E. W. : Guarded Commands, Non Determining and Formal Derivation of Programs

Dijkstra E. W. : The Structure of"the" Multiprogramming System
in Writing of the Revolution.Yourdon Press (1982)

Dyer M. : Software Development Practices
in IBM System Journal, vol 19 n^{r} 4 (1980)

Emery : Cost/Benefit Analysis of Information Systems
in Writing of the Revolution.Yourdon Press (1982)

Fisher & Böcker : The Nature of Design Processes and How Computer System can support them
in Integrated Interactive Computing Systems ECICS

Follett : Describing the Complete Effect of Programs
in Lecture Notes in Computer Science : Language Design and Programming Methodology . Springer Verlag (1980)

Foo : Algebraic Specifications and Transition Graphs
in Lecture Notes in Computer Science : Language Design and Programming Methodology . Springer Verlag (1980)

Franckel E. C. : A Contracts Course for Software Engineers
in ACM Sigsoft Software Engineers Notes, vol '7 n° 4 (Oct 1982)

Gerhart : A Derivation Oriented Proof of the Schare - Warrier Marking Algorithm
in Lecture Notes : Program Construction . Springer Verlag(1978)

Giacalone : Toward a Formally Based Programming Environment
in Integrated Interactive Computing System ECICS

Glass R. L. :Software Engineering Economics : Learning from Failures
in Software Forum 1983

Graham : A Software Design and Evaluation System
in Writing of the Revolution. Yourdon Press (1982)

Gries D. : On Structured Programming
in Programming Methodology (IFLP WG 2-3). Springer Verlag(1978)

Gries D. & Owicki : An Axiomatic Proof Technique for Parallel Programs
in Programming Methodology (IFLP WG 2-3). Springer Verlag(1978)

Gries D. : The Schore - Warrier Graph Marking Algorithm
in Lecture Notes, Program Construction . Springer Verlag(1978)

Gries D. : Eliminate the Chaff
in Lecture Notes, Program Construction . Springer Verlag(1978)

Gries D. : Current Ideas in Programming Methodology
in Lecture Notes, Program Construction . Springer Verlag(1978)

Gries D. : Basic Axiomatic Definitions
in Lecture Notes, Program Construction . Springer Verlag(1978)

Gries D. : The Mutiple Assignement Statement
in Lecture Notes, Program Construction . Springer Verlag(1978)

Gries D. : Is Sometimes ever Better then Always ?
in Lecture Notes, Program Construction . Springer Verlag(1978)

Griffiths : Development of the Schare - Warrier Algorithm
in Lecture Notes, Program Construction . Springer Verlag(1978)

Griffiths : Programming Methodology and Language Implication
in Lecture Notes, Program Construction . Springer Verlag(1978)

Guttag : Notes on Types Abstractions
in Lecture Notes, Program Construction . Springer Verlag(1978)

Halassy B. : SZIAM : A Data Model Design Aid
in Lecture Notes in Computer Science : Specification and Design of Software System.Springer Verlag (1983)

Hansen B. : Structured Multiprogramming
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hansen B. : The Programming Language Concurrent Pascal
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hansen B. : The Architecture of Concurrent Programs
Prentice Hall (1977)

Herbinson E. : A Human Movement Language for Computer Animation
in Lecture Notes in Computer Science : Language Desing and Programming Methodology.Springer Verlag (1980)

Hext : Pattern Matching Commands
in Lecture Notes in Computer Science : Language Design and Programming Methodology.Springer Verlag (1980)

Hoare C. A. R. : The Engineering of Software : a Startling Contradiction
in Programming Methodology (IFLP WG 2-3).Springer Verlag(1978)

Hoare C. A. R. : An Axiomatic Basis for Computer Programming
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hoare C. A. R. : Proof of a program :FIND
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hoare C. A. R. : Towards a Theory of Parallel Programming
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hoare C. A. R. : Moniters : an Operating System Structuring Concept
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hoare C. A. R. : Proof of Correctness of Data Representation
in Programming Methodology (IFLP WG 2-3).Springer Verlag (1978)

Hoare C. A. R. : The Emperor's Old Clothers
in Writing of the Revolution.Yourdon Press (1982)

Horning : Verification of EUCLID Programs
in Lecture Notes, Program Construction.Springer Verlag (1978)

Horning : A Case Study in Language Design : EUCLID
in Lecture Notes, Program Construction.Springer Verlag (1978)

Horning : Programming Language for Reliable Computing Systems
in Lecture Notes, Program Construction.Springer Verlag (1978)

Ichbiah J. : ADA : Past, Present, Futur
in CACM Oct 1984, vol 27 n° 10

Jackson M. A. : System Development
Prentice Hall (1983)

Jemers R. A. : System Design for Usability
in CACM, vol 24 n° 8 (Aug 1982)

Jensen K & Wirth N. : Pascal User Manual and Report
Springer Verlag (1978)

Johnston & Lister : An Experiment in Software Science
in Lecture Notes in Computer Science : Language Design and Programming Methodology. Springer Verlag (1980)

Joslin P. H. : System Productivity Facility
IBM System Journal, vol 20 n° 4 (1981)

Katz : A Two-way Natural Language Interface
in Integrated Interactive Computing Systems ECICS

Knuth D. E. : Notes on Avoiding "GOTO" Statements
in Writing of the Revolution. Yourdon Press (1982)

Komorovski : An Abstract Prolog Machin
in Integrated Interactive Computing Systems ECICS

Kramer J. : Distributed Computer Systems
in Lecture Notes in Computer Science : Specification and Design of Software Systems. Springer Verlag (1983)

Lee : DOPLS : A New Type of Programming Language
in Lecture Notes in Computer Science : Language Design and Programming Methodology. Springer Verlag (1980)

Lehman M. M. & all : Another Look at Software Design Methodology
in ACM Sigsoft Software Engineering Notes, vol 9 n° 2 (April 1984)

Lehman M. M. : Programs, Cities, Students - Limits to Growth ?
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Leveson N. G. : Software Safety
in ACM Sigsoft Software Engineering Notes, vol 7 n° 2(April 1982)

Liebermann : Designing Interactive Systems from the User's Vieuwpoint
in Integrated Interactive Computing Systems ECICS

Linger R. C. : Software Design Practices
in IBM System Journal, vol 19 n° 4 (1980)

London & all : Proof Rules for the Programming Language Euclid
in Lecture Notes, Program Construction. Springer Verlag (1978)

Lowell J. A. : Programmer Productivity
Wiley Interscience Publication (1983)

Ludewig J. : ESPRESO : A System for Process Control Software Specification
in Lecture Notes in Computer Science : Specification and
Design of Software Systems. Springer Verlag (1983)

Mac Cracken D. D. & Jackson M. A. : Life Cycle Concept Considered Harmful
in ACM Sigsoft Software Engineering Notes, vol 7 n° 2(April 82)

Maddison & all : Information System Methodologics (1983)

Maté L. L. & all : System Cars and its Description Language
in Lecture Notes in Computer Science : Specification and
Design of Software Systems. Springer Verlag (1983)

Mathews & all : The Computers in Cartoons
CACM, vol 27 n° 11

Merlin : The Practical Guide to Structured Systems Design

Meyer B. : Towards a Two Dimensional Programming Environment
in Integrated Interactive Computing Systems ECICS

Mikelsons : Interactive Program Execution
in ACM Sigsoft Sigplan (1983)

Miller G. M. : The Magical Number Seven, Plus or Minus Two
in Writing of the Revolution. Yourdon Press(1982)

Mills H. D. : Mathematical Fundations for Structured Programming
in Writing of the Revolution. Yourdon Press (1982)

Mills H. D. & all : The Management of Software Engineering
in IBM System Journal, vol 13 n° 4 (1980)

Mills H. D. : Top Down Programming in Large Systems

Mitchell R. S. : Program Design - A Practical Approach
in Lecture Notes in Computer Science : Specification and
Design of Software Systems. Springer Verlag (1983)

Musa D. & all : Stimulating Software Engineering Progress : A Report of
the Software Engineering Planning Group
in ACM Sigsoft Software Engineering Notes, vol 8 n° 2(April 83)

Myers G. J. : Program Design Validation System
in IBM Technical Disclosure Bulletin, vol 19 n° 10 (March 1977)

Myers G. J. : Program Design Query System
in IBM Technical Disclosure Bulletin, vol 19 n^{r} 10 (March 1977)

Neuhold E. S. : Development Methodologics for Event and Message Based Application System
in Lecture Notes in Computer Science : Specification and Design of Software System. Springer Verlag (1983)

Newman : Office-Talk-Zero : An Experimental Integrated Office System
in Integrated Interactive Computing Systems ECICS

O'Neill D. : Software Engineering Progress
in IBM System Journal, vol 19 n^{r} 4 (1980)

Owicki : Specifications and Proofs for Abstract Data Types in Concurrent Programs
in Lecture Notes, Program Constructions. Springer Verlag (1978)

Owicki :Specification and Verification of a Network Mail System
in Lecture Notes, Program Constructions. Spinger Verlag (1978)

Pair : Some Theorical Aspects of Program Construction
in Lecture Notes, Program Constructions. Spinger Verlag (1978)

Parnas D. L. : On a "Buzzword" : Hierarchical Structure
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Parnas D. L. : On the Design and Development of Program Families
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Peeters : Software Design : Methods and Techniques
Yourdon Press (1982)

Pritchard : On the Prime Example of Programming
in Lecture Notes in Comuter Science : Language Design and programming Methodology. Springer Verlag (1980)

Quinnan R. E. : Software Engineering Management Practices
in IBM System Journal, vol 19 n^{r} 4 (1980)

Quint : An interactive System for Editing Mathematical Documents
in Integrated Interactive Computing Systems ECICS

Rajamaran M. K. : A Characterization of Software Design Tools
in ACM Sigsoft Software Engineering Notes, vol 7 n^{r} 4 (Oct 1982)

Rechenberg & all : Softwareengineering
Osterreichish Computer Geselschaft (1983)

Reynolds : Programming with Transition Diagrams
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Rice : Build Program Technique
Wiley Interscience Publication (1982)

Richardson G. L. & all : A Primer on Structured Design (1983)

Riddle W. E. : A Study of Software Technical Maturation
in ACM Sigsoft Software Engineering Notes, vol 9 n° 2(April 1984)

Ritchie : The Evolution of the UNIX Time Sharing Systems
in Lecture Notes in Computer Science : Language Design and Programming Methodology. Springer Verlag (1980)

Rohl : Why Recursion ?
in Lecture Notes in Computer Science : Language Design and Programming Methodology. Springer Verlag (1980)

Ross : Structured Analysis : A Language for Communicating Ideas
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Ross : A Garbage Collecting Association Memory for Interactive Database Systems
in Integrated Interactive Computing Systems ECICS

Sakman : Explorating Expermental Studies Comparing Online and Offline Programming Performance
in Writing of the Revolution. Yourdon Press (1982)

Sammat & Cohen : A Language for Describing Concepts as Program
in Lecture Notes in Computer Science : Language Design and programming Methodology. Springer Verlag (1980)

Sansonnet : A Hardware Support for Interactive Programming Environments
in Integrated Interactive Computing Systems ECICS

Schneider L. : Systems Design for, with and by the User
North Holland (1983)

Schwartz J. T. : An Overview of Bugs

Sergot : A Query-the-User Facility for Logic Programming
in Integrated Interactive Computing Systems ECICS

Shaw B. C. & all : Introduction of a Formal Technic into a Software Development Environment
in ACM Sigsoft Software Engineering Notes, vol 9 n° 2(April 1984)

Shooman M. L. : Software Reliability : A Historical Perspective
in IEEE, vol R-33 n°1 (April 1984)

Smith : Designing the STAR User Interface
in Integrated Interactive Computing Systems ECICS

Smoliar : An Interactive Approach to Software Specification
in Integrated Interactive Computing Systems ECICS

Sommerville I. : Software Engineering
Addison Wesley (1982)

Sommerville I. : System Development Process
Addison Wesley (1982)

Spicer J. C. : A Spiral Approach to Software Engineering Project Management Education
in ACM Sigsoft Software Engineering Notes, vol 8 n° 3 (Jul 1983)

Steels : Orbit : An Application View of Object Oriented Programming
in Integrated Interactive Computing Systems ECICS

Stenning V. & all : The ADA Environment : A Perspective
Computer Journal IEEE (1981)

Stevens W. P. & all : Structured Design
in IBM System Journal n° 2 (1974)

Thadans A. J. : Interactive User Productivity
in IBM System Journal, vol 20 n° 4 (1981)

Tichy : RCS : A Revision Control System
in Integrated Interactive Computer Systems ECICS

Turski : Software Engineering : Some Principles and Problems
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Walstone & Felix : A Method of Programming Measurement and Estimation
in Writing of the Revolution. Yourdon Press (1982)

Weber : Programmentwurf and Programdokumentation
UDI - Verlag (1982)

Weinberg M. A. : The Psychology of Computer Programming 1979

Wertz : An Integrated, Interactive and Incremental Programming Environment for the Development of Complex Systems
in Integrated Interactive Computing Systems ECICS

Wertz : An Integrated LISP Programming Environment
in ACM Sigsoft/Sigplan Symposium on High Level Debugging (1983)

Winograd T. : Beyond Programming Languages
in CACM, vol 22 n° 7 (Jul 1979)

Wirth N. : Program Development by Stepwise Raffinement
in Programming Methodology (IFLP WG 2-3). Springer Verlag (1978)

Wirth N. : A Personal Computer Based on a High-Level Language
in Lecture Notes in Computer Science : Language Design and
Programming Methodology. Springer Verlag (1980)

Wirth N. : Algorithmes + Data Structures = Programs
Prentice Hall (1977)

Woodward : A Measure of Floow Compliaity on Program Text
in Writing of the Revolution. Yourdon Press (1982)

Yourdon E. & Constantine L. L. : Structured Design
Prentice Hall (1979)

Yourdon E. : The Practical Guide to Structured Design
Yourdon Publication (1981)

Yourdon E. : The Futur of Software
in Software Forum (1983)

Zieghr C. A. : Programming System Methodologics
Prentice Hall (1983)

Zieghr S. : ADA for the Intel 432 Micro Computer
Computer Journal IEEE (June 1981)

AID / AIDSYS

This is often what is given to the users, in order to propose to them the new functions and their interfaces.

3.2.4 Funktion SYSTEM-EDIT

- Die folgenden Werte des Feldes ASASEKEY haben sich geaendert:

ASASETSK	X'24'	-->	X'18'
ASASEQU	X'18'	-->	X'1C'
ASASEPND	X'1C'	-->	X'20'
ASASEALL	X'20'	-->	X'24'
ASASEKMX	X'2C'	-->	X'28'
ASASEFTT	nil	-->	X'28'
ASASETFT	X'28'	-->	gestrichen
ASASETL	X'2C'	-->	gestrichen

- Die Anzeigen ASASEFB.ASASEFIT bzw. .ASASEFTS werden nicht mehr abgefragt.

- Neue Anzeigen:

ASASEFB.ASASESTB EQU X'02' wird nur bei Keywort AUDIT ausgewertet in der Bedeutung: 'nur Original-Tabelle gewuenscht'

ASASSEFB.ASASEIXV EQU X'01' angegebener Index ist gueltig. wird nur dann ausgewertet, falls der Index gleich Null ist.

- Neue Rueckkehr-Parameter:

ASASENAL EQU X'3C' nur bei Keywort AUD1/AUD2 moeglich. wegen Speichermangel wird nur die Originaltabelle geliefert.

ASASELOP EQU X'40' PCB-Schleife entdeckt. Puffer wurde mit Information gefuellt, es ist aber kein Fortsetzungsaufruf mehr moeglich

ASASESER EQU X'44' Tabelle ist wegen kaputter Pointer nicht ausgebbar (Systemfehler)

ASASENP EQU X'48' Nur fuer PCB-Zugriffe: Die gelieferte Information ist moeglicherweise kein PCB. (Plausibilitaetscheck liefert Fehler)

3.2.5 Funktion 'Open Memory Pool'

This should always be provided, in order to see what are the modules that can call this one and that are called by this one .

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
000000                                       1  DPACCESS  START                                                    00004000
                                             2            TITLE 'INTERFACE BETWEEN USER AND AIDSYS'                00009000
                                             3  ************************************************************** 00019000
                                             4  *                                                              * 00029000
                                             5  *         M O D U L E      F U N C T I O N A L                 * 00039000
                                             6  *                                                              * 00049000
                                             7  *              D E S C R I P T I O N                           * 00059000
                                             8  *                                                              * 00069000
                                             9  ************************************************************** 00079000

                                            10  ************************************************************** 00099000
                                            11  * ********************************************************** * 00109000
                                            12  * *                                                        * * 00119000
                                            13  * *     THE PURPOSE OF THIS MODULE IS TO PROVIDE FOR P1     * * 00129000
                                            14  * *     PROGRAMS,ACCESS TO DUMPFILE.                       * * 00139000
                                            15  * *                                                        * * 00149000
                                            16  * *     THE FOUR FUNCTIONS PROVIDED BY THIS PROGRAM ARE :  * * 00159000
                                            17  * *                                                        * * 00169000
                                            18  * *     1.CMFCT : GET INFORMATION ABOUT CSECT MAP           * * 00179000
                                            19  * *                                                        * * 00189000
                                            20  * *     2.GAFCT : GET INFORMATION ABOUT THE CSECT CONTAINING* * 00199000
                                            21  * *               THE ADDRESS GIVEN BY THE CALLER          * * 00209000
                                            22  * *                                                        * * 00219000
                                            23  * *                                                        * * 00229000
                                            24  * *         3.PEFCT : PROVIDE THE USER THE INFORMATION ABOUT* * 00239000
                                            25  * *                   THE PROGRAM UNIT(PE)                 * * 00249000
                                            26  * *                                                        * * 00259000
                                            27  * *         4.CRIAFCT : PROVIDE THE USER THE INFORMATION   * * 00269000
                                            28  * *                   ABOUT THE CONCISE REPS INFORMATION AREA* * 00279000
                                            29  * *                                                        * * 00289000
                                            30  * ********************************************************** * 00299000
                                            31  *                                                            * 00309000
                                            32  *                                                            * 00319000
                                            33  * ********************************************************** * 00329000
                                            34  * *                                                        * * 00339000
                                            35  * *                                                        * * 00349000
                                            36  * *         FOR MOST PRECISE INFORMATION ABOUT THE FUNCTION * * 00359000
                                            37  * *         PLEASE,SEE WHERE THEY ARE CALLED.              * * 00369000
                                            38  * *                                                        * * 00379000
                                            39  * *                                                        * * 00389000
                                            40  * ********************************************************** * 00399000
                                            41  *                                                            * 00409000
                                            42  *                                                            * 00419000
                                            43  * ********************************************************** * 00429000
                                            44  * *                                                        * * 00439000
                                            45  * *                                                        * * 00449000
                                            46  * *           THE USER IS EXPECTED TO GIVE :               * * 00459000
                                            47  * *                                                        * * 00469000
                                            48  * *         #1.THE REGISTER 1 HAS TO POINT TO THE CALLER   * * 00479000
                                            49  * *            PARAMETER LIST                              * * 00489000
                                            50  * *                                                        * * 00499000
                                            51  * *         #2.THE CALL HAS TO BE DONE VIA A BAL(R) 14,15(=..)* * 00509000
                                            52  * *                                                        * * 00519000
                                            53  * *         #3.THE CALLER HAS TO GIVE OR AN ADDRESS OF HIS READ* * 00529000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                          54     * *          DUMPFILE ROUTINE AND THE ITN OF HIS ACCESSED TASK    * * 00539000
                                          55     * *          OR NO ADDRESS OF A READ ROUTINE BUT A  VALID LINK    * * 00549000
                                          56     * *          NUMBER OF HIS DUMPFILE.                              * * 00554000
                                          57     * *                                                               * * 00559000
                                          58     * *       #4.FOR THE OTHER FUNCTION THEN GAFCT,HE HAS TO          * * 00569000
                                          59     * *          GIVE A BUFFER ADDRESS AND THE LENGTH OF THE          * * 00579000
                                          60     * *          LENGTH OF THE BUFFER.                                * * 00589000
                                          61     * *                                                               * * 00599000
                                          62     * *       #5.!!!!!! IMPORTANT !!!!!!!!                            * * 00609000
                                          63     * *                                                               * * 00619000
                                          64     * *          THE USER CAN NOT GIVE AN NULL VALUE                  * * 00629000
                                          65     * *          ===================================                  * * 00639000
                                          66     * *                                                               * * 00649000
                                          67     * *        TO A MANDATORY PARAMETER,IT WILL BE UNDERSTANDED       * * 00651000
                                          68     * *        ================================================       * * 00654000
                                          69     * *                                                               * * 00656000
                                          70     * *        AS IF NO PARAMETER WAS GIVEN!!!                        * * 00656700
                                          71     * *        ==============================                         * * 00657500
                                          72     * *                                                               * * 00658200
                                          73     * *                                                               * * 00659000
                                          74     * ********************************************************************* * 00669000
                                          75     *                                                                     * 00679000
                                          76     *                                                                     * 00689000
                                          77     * ********************************************************************* * 00699000
                                          78     * *                                                               * * 00709000
                                          79     * *                                                               * * 00719000
                                          80     * *          THE MODULE ALWAYS GIVE THE RETURN CODE INTO THE      * * 00729000
                                          81     * *          SPECIAL FIELD OF THE PARAMETER LIST.                 * * 00739000
                                          82     * *                                                               * * 00749000
                                          83     * *          THE RETURNING PARAMETER ARE SET INTO THE USER        * * 00759000
                                          84     * *          BUFFER.OF COURSE NOT THE GAFCT,WHERE THERE IS        * * 00769000
                                          85     * *          NO BUFFER, IN THIS CASE THE RETURNING INFORMATIONS    * * 00779000
                                          86     * *          ARE AFTER THE CALLER ARGUMENTS                       * * 00789000
                                          87     * *                                                               * * 00799000
                                          88     * *                                                               * * 00809000
                                          89     * *          THE RETURN CODE FROM THIS MODULE ARE :               * * 00819000
                                          90     * *                                                               * * 00829000
                                          91     * *       $1.X'00'  NO PROBLEMS.                                  * * 00839000
                                          92     * *                                                               * * 00849000
                                          93     * *       $2.X'04'  FORMAL ERROR                                  * * 00859000
                                          94     * *                                -BUFFER NOT WORD ALIGNED     * * 00869000
                                          95     * *                                -NO BUFFER GIVEN             * * 00879000
                                          96     * *                                -NO BUFFER LENGTH GIVEN      * * 00889000
                                          97     * *                                -NO TCB ADDRESS GIVEN        * * 00890000
                                          98     * *                                -NO XVT ADDRESS GIVEN        * * 00892000
                                          99     * *                                -NO SYSBASE ADDRESS GIVEN    * * 00893000
                                         100     * *                                -NEITHER A(READ) NOR LINK# GIVEN * * 00895000
                                         101     * *                                -INVALID ITN GIVEN           * * 00919000
                                         102     * *                                -INVALID SUBFUNCTION CODE    * * 00929000
                                         103     * *                                                               * * 00939000
                                         104     * *        $3.X'08' MODULE ERROR,THIS IS WHEN AN UNEXPECTED       * * 00941000
                                         105     * *           ERROR HAS OCCURED IN A OTHER MODULE CALL.           * * 00944000
                                         106     * *                                                               * * 00946000
                                         107     * *        $4.X'0C' A(TCB) OR A(XVT) OR A(SYSBASE) ARE NOT        * * 00946200
                                         108     * *           WORD ALIGNED.                                       * * 00946400
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                          109     * *                                                                 * * 00946600
                                          110     * *       $5.X'10' FILE IS NOT OPEN.                                * * 00946900
                                          111     * *                                                                 * * 00947100
                                          112     * *       $6.X'14' SPECIFIED TASK NOT FOUND.                        * * 00947300
                                          113     * *                                                                 * * 00947600
                                          114     * *       $7.X'18' TASK QUALIFICATION NECESSARY.                    * * 00947800
                                          115     * *                                                                 * * 00948000
                                          116     * *       $8.X'1C' INVALID LINK NUMBER.                             * * 00948300
                                          117     * *                                                                 * * 00948500
                                          118     * *       $9.X'20' INVALID INDICATOR OF DUMPFILE TYPE.              * * 00948700
                                          119     * *                                                                 * * 00948800
                                          120     * *       $10.X'24' A(READ) GIVEN BUT NO ITH GIVEN                  * * 00948850
                                          121     * *                                                                 * * 00948900
                                          122     * *       $11.X'28' BUFFER FULLFILED WITH INFORMATION BUT           * * 00949000
                                          123     * *          FURTHER CALL ARE NEEDED IF ALL INFORMATION ARE NEEDED  * * 00959000
                                          124     * *          IF GETADDRESS FUNCTION,THEN THAT WILL SAY ADDRESS NOT  * * 00962000
                                          125     * *          ALLOCATED.                                             * * 00965000
                                          126     * *                                                                 * * 00969000
                                          127     * *       $12.X'2C' BUFFER WRITE UNACCESSIBLE IN FULL LENGTH        * * 00979000
                                          128     * *           IF GETADDRESS FUNCTION,THEN THAT WILL SAY INPUT       * * 00982000
                                          129     * *           ADDRESS IN CONFLICT WITH FLAG.                        * * 00985000
                                          130     * *                                                                 * * 00989000
                                          131     * *       $13.X'30' PE NOT FOUND BUFFER IS EMPTY                    * * 01039000
                                          132     * *           IF GETADDRES FUNCTION,THEN THAT WILL SAY THAT         * * 01042000
                                          133     * *           NO PAGE IS DUMPED.                                    * * 01045000
                                          134     * *                                                                 * * 01049000
                                          135     * *       $14.X'34' BUFFER LENGTH TOO SHORT TO CONTAIN              * * 01059000
                                          136     * *          ONLY ONE ANSWER.                                       * * 01069000
                                          137     * *          IF GETADDRESS FUNCTION,THEN THAT WILL SAY THAT         * * 01069700
                                          138     * *          ERROR IN SYSTEM.                                       * * 01070500
                                          139     * *                                                                 * * 01071300
                                          140     * *       $15.X'38' NO PROGRAM IS LOADED.                           * * 01072000
                                          141     * *                                                                 * * 01072800
                                          142     * *       $16.X'3C' NO CSECT MAP FOUND,BUFFER IS EMPTY.             * * 01073600
                                          143     * *                                                                 * * 01074300
                                          144     * *       $17.X'40' PAGE NOT DUMPED.                                * * 01075100
                                          145     * *                                                                 * * 01075900
                                          146     * *       $18.X'44' ERROR IN SYSTEM.                                * * 01076600
                                          147     * *                                                                 * * 01077400
                                          148     * *       $19.X'48' OLD FORMAT OF LOAD-INFORMATION                  * * 01078200
                                          149     * *                                                                 * * 01110000
                                          150     * *       $20.X'4C' INFORMATIONS ARE MISSING IN DUMPFILE.           * * 01150000
                                          151     * *                                                                 * * 01189000
                                          152     * *                                                                 * * 01199000
                                          153     * ********************************************************************* * 01209000
                                          154     *                                                                     * 01219000
                                          155     *                                                                     * 01229000
                                          156     * ********************************************************************* * 01239000
                                          157     * *                                                                 * * 01249000
                                          158     * *                                                                 * * 01259000
                                          159     * *   THE MODULE CALL : AIDSYS45.MOD AND A MODIFIED ROUTINE         * * 01269000
                                          160     * *                     AS4ITNDP AND AS4RDPGE.                      * * 01274000
                                          161     * *          ERROR IN SYSTEM.                                       * * 01279000
                                          162     * *                                                                 * * 01289000
                                          163     * *       $15.X'38' NO PROGRAM IS LOADED.                           * * 01299000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                  164     * *                                                                 * * 01309000
                                  165     * *       $16.X'3C' NO CSECT MAP FOUND,BUFFER IS EMPTY.             * * 01319000
                                  166     * *                                                                 * * 01329000
                                  167     * *       $17.X'40' PAGE NOT DUMPED.                                * * 01339000
                                  168     * *                                                                 * * 01349000
                                  169     * *       $18.X'44' ERROR IN SYSTEM.                                * * 01359000
                                  170     * *                                                                 * * 01369000
                                  171     * *       $19.X'48' OLD FORMAT OF LOAD-INFORMATION                  * * 01379000
                                  172     * *                                                                 * * 01389000
                                  173     * *       $20.X'4C' INFORMATIONS ARE MISSING IN DUMPFILE.           * * 01399000
                                  174     * *                                                                 * * 01409000
                                  175     * *                                                                 * * 01419000
                                  176     * ********************************************************************* * 01429000
                                  177     *                                                                     * 01429600
                                  178     *                                                                     * 01449000
                                  179     * ********************************************************************* * 01459000
                                  180     * *                                                                 * * 01469000
                                  181     * *                                                                 * * 01479000
                                  182     * *   THE MODULE CALL : AIDSYS45.MOD AND A MODIFIED ROUTINE         * * 01489000
                                  183     * *                     AS4ITNDP AND AS4RDPGE.                      * * 01499000
                                  184     *                                                                     * 01509000
                                  185     ********************************************************************* 01519000

000000                            186     R#00      EQU   0                                                     01539000
000001                            187     R#01      EQU   1                                                     01549000
000002                            188     R#02      EQU   2                                                     01559000
000003                            189     R#03      EQU   3                                                     01569000
000004                            190     R#04      EQU   4                                                     01579000
000005                            191     R#05      EQU   5                                                     01589000
000006                            192     R#06      EQU   6                                                     01599000
000007                            193     R#07      EQU   7                                                     01609000
000008                            194     R#08      EQU   8                                                     01619000
000009                            195     R#09      EQU   9                                                     01629000
00000A                            196     R#10      EQU   10                                                    01639000
00000B                            197     R#11      EQU   11                                                    01649000
00000C                            198     R#12      EQU   12                                                    01659000
00000D                            199     R#13      EQU   13                                                    01669000
00000E                            200     R#14      EQU   14                                                    01679000
00000F                            201     R#15      EQU   15                                                    01689000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                  202    ********************************************************************************* 01709000
                                  203    *                                                                               * 01719000
                                  204    *                                                                               * 01729000
                                  205    *         MOST OF THE REGISTERS HAVE ALWAYS THE SAME MEANING                    * 01739000
                                  206    *         WHICH ARE DESCRIBE HERE :                                             * 01749000
                                  207    *                                                                               * 01759000
                                  208    *         REGISTER 01 : COVER PARAMETER LIST TO CALL                            * 01769000
                                  209    *                                                                               * 01779000
                                  210    *         REGISTER 02 : WILL SERVE TO PASS THE VALUE OF CERTAIN PARAM           * 01789000
                                  211    *                                                                               * 01799000
                                  212    *         REGISTER 03 : WORK REGISTER TO TEST THE USER INPUT                    * 01809000
                                  213    *                                                                               * 01819000
                                  214    *         REGISTER 04 : BASE (DYNDATA)                                          * 01829000
                                  215    *                                                                               * 01839000
                                  216    *         REGISTER 05 : BASE (STATDATA)                                         * 01849000
                                  217    *                                                                               * 01859000
                                  218    *         REGISTER 06 : UNUSED                                                  * 01869000
                                  219    *                                                                               * 01879000
                                  220    *         REGISTER 07 : WORK REGISTER TO TEST THE USER INPUT                    * 01889000
                                  221    *                                                                               * 01899000
                                  222    *         REGISTER 08 : BASE (PARAMLIST OF USER)                                * 01909000
                                  223    *                                                                               * 01919000
                                  224    *         REGISTER 09 : UNUSED                                                  * 01929000
                                  225    *                                                                               * 01939000
                                  226    *         REGISTER 10 : BASE (USER BUFFER)                                      * 01949000
                                  227    *                                                                               * 01959000
                                  228    *         REGISTER 11 : UNUSED                                                  * 01969000
                                  229    *                                                                               * 01979000
                                  230    *         REGISTER 12 : BASE REGISTER OF THE PROGRAM                            * 01989000
                                  231    *                                                                               * 01999000
                                  232    *         REGISTER 13 : ADDRESS OF SAVE AREA                                    * 02009000
                                  233    *                                                                               * 02019000
                                  234    *         REGISTER 14 : RETURN ADDRESS                                          * 02029000
                                  235    *                                                                               * 02039000
                                  236    *         REGISTER 15 : FORWARD BRANCH REGISTER                                 * 02049000
                                  237    *                                                                               * 02059000
                                  238    ********************************************************************************* 02069000
                                  239             PRINT GEN,XREF                                                          02079000
```

The DSECT MALIB, defines the modifications done by adding the new functions to AIDSYS . This modificati-ns refer to the DSECT SERVE . This DSECT SERVE i- used by all functions . If someone i- interested in seeing what is a flexibl- interface he (she) can look for more details in this DSECT . What should be interesting is how to do it in a high level language .

In all cases, I will say : "Good luck !"

This kind of interfaces is,perhaps, one reason of the problem of dealing with the understanding of the interfaces . For me, it took a lot of time to understand it and to be able to modify it .

This also will show what can be difficult in dealing with a so complex and so used interfaces . Indeed, how can be sure that the modification you are doing has no influence on the rest of the interfaces ?

```
FLAG LØCTN ØBJECT CØDE   ADDR1  ADDR2  STMNT M  SØURCE STATEMENT

                                  240     MALIB   DSDPA                                                   02099000
                                  241   1 ********************************************************************
                                  242   1 *                                                                  *
                                  243   1 *          T H E   &I D   DØ E S   N E V E R   H A V E             *
                                  244   1 *                                                                  *
                                  245   1 *          MØ R E   T H E N   3   C H A R A C T E R S             *
                                  246   1 *                                                                  *
                                  247   1 ********************************************************************


000000                            248   1 MALIB    DSECT
                                  249   1 ********************************************************************
                                  250   1 *                                                                  *
                                  251   1 *          THE FIRST PART ØF THE MACRØ DESCRIBES THE CØMMØN        *
                                  252   1 *          PARAMETERS USED BY ALL FØUR SUBFUNCTIØNS:               *
                                  253   1 *           -CMFCT:FUNCTIØN USED TØ GET THE CSECT MAP INFØRMATIØN  *
                                  254   1 *                                                                  *
                                  255   1 *           -GAFCT:FUNCTIØN USED TØ GET INFØRMATIØN ABØUT THE CSECT*
                                  256   1 *                  CØNTAINING THE GIVEN ADDRESS.                   *
                                  257   1 *                                                                  *
                                  258   1 *          -PEFCT:FUNCTIØN USED TØ GET THE PØINTER TØ THE PRØGRAM UNIT *
                                  259   1 *                 ØR ALSØ CALLED PRØGRAMM EINHEIT GIVEN            *
                                  260   1 *                                                                  *
                                  261   1 *         FØLLØWING THE CØMMØN INPUT PARAMETERS,THERE ARE THE FUNCTIØN *
                                  262   1 *         SPECIFIC RETURN PARAMETERS.                              *
                                  263   1 *                                                                  *
                                  264   1 ********************************************************************


000000 00                         265   1 DPAFCT   DC    X'00'          NUMBER ØF FUNCTIØN TØ BE CALLED
                    000000        266   1 DPACMSFT EQU   X'00'          NUMBER ØF CSECT MAP FUNCTIØN
                    000004        267   1 DPAGASFT EQU   X'04'          NUMBER ØF GET ADDRESS FUNCTIØN
                    000008        268   1 DPAPUSFT EQU   X'08'          NUMBER ØF PU FUNCTIØN
                    000008        269   1 DPAMAXNF EQU   X'08'          MAXIMAL NUMBER ADMITTED FØR A FUNCTIØN
000001 00                         270   1 DPARTN   DC    X'00'          RETURN CØDE,SEE EQU'S GIVEN AT THE
                                  271   1 *                           SPECIFIC FUNCTIØN
000004 00000000                   272   1 DPALINK  DC    F'0'           DUMPFILE-LINKNUMBER.HAVE TØ BE GIVEN IF
                                  273   1 *                           NØ A(READRØUTINE) 'READ' WAS GIVEN.
000008 00000000                   274   1 DPAREAD  DC    A(0)           A(DUMPFILE'S READ RØUTINE ØF CALLER)
                                  275   1 *                           IF GIVEN,THEN 'DPACCES' DØES NØT NEED
                                  276   1 *                           HAVE IT'S ØWN DUMPFILE-ACCESS RØUTINE
00000C 00000000                   277   1 DPAATCB  DC    A(0)           A(TCB) TØ BE PRØVIDED BY THE CALLER
                                  278   1 *
000010 00000000                   279   1 DPASYSBS DC    A(0)           A(SYSBASE) TØ BE PRØVIDED BY THE CALLER
                                  280   1 *
000014 00000000                   281   1 DPAAXVT  DC    A(0)           A(XVT) TØ BE PRØVIDED BY THE CALLER
                                  282   1 *
000018 00000000                   283   1 DPAIND   DC    F'0'           INDICATØR ØF THE DUMPFILE  TYPE.
                                  284   1 *
00001C 00000000                   285   1 DPAITN   DC    F'0'           THE ITN NUMBER (JUSTIFIED RIGHT) ØF THE
                                  286   1 *                           TASK TØ BE ACCESSED.
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        287  1 *                                THIS IS NEEDED ONLY FOR SLED-FILES,IF
                                        288  1 *                                A TASK SPECIFIC INFORMATION SHOULD BE
                                        289  1 *                                ACCESSED.
000020 00000000                         290  1 DPABUFAD DC    A(0)             A(CALLER BUFFER);WORD-ALIGNED
000024 00000000                         291  1 DPABUFLE DC    F'0'             LENGTH OF CALLER BUFFER
000028 00                               292  1 DPAFLAG  DC    X'00'            FLAG BYTE
                                        293  1 *                                PART TO BE ACCESSED
                        000004          294  1 DPAUSER  EQU   X'04'            ONLY NOT PRIVILEGED TO BE ACCESSED
                        000008          295  1 DPASYST  EQU   X'08'            ONLY     PRIVILEGED TO.BE ACCESSED
                                        296  1 *                                IF NEITHER IS SET THEN ACCESS OF
                                        297  1 *                                PRIVILEGED PU IS ASSUMED,IF BOTH
                                        298  1 *                                ARE SPECIFIED,THE FIRST PU THAT
                                        299  1 *                                WILL BE FOUND WITH THE GIVEN NAME
                                        300  1 *                                WIL BE TAKEN,REGARDLESS OF PRIVILEGE
                                        301  1 *                                STATE.SEARCH WIL STARTED WITH NON-
                                        302  1 *                                PRIVILEGED PU'S.
                        00000C          303  1 DPAALL   EQU   DPAUSER+DPASYST IF BOTH ARE DESIRED
                        000020          304  1 DPASUCC  EQU   X'20'            SUCCESSIVE CALL
                        00002C          305  1 DPAFLAGM EQU   DPASUCC+DPAALL MAXIMAL VALUE OF THE FLAG


                        000029          306  1 DPADIV2  EQU   *




                                        307  1 ********************************************************************************
                                        308  1 *                                                                              *
                                        309  1 *         ADDITIONAL INPUT PARAMETERS NEEDED TO CALL THE CSECT MAP             *
                                        310  1 *         FUNCTION.                                                            *
                                        311  1 *                                                                              *
                                        312  1 ********************************************************************************


000029 4040404040404040                 313  1 DPACMNAM DC    CL41' '          NAME OF PROGRAM UNIT.IF NO NAME IS
                                        314  1 *                                 GIVEN,THE DEFAULT IS
                                        315  1 *                                  USER PROGRAM   IF &ID.FLAG = &ID.USER
                                        316  1 *
                                        317  1 *                                  SYSTEM NUCLEUS IF &ID.FLAG = &ID.SYST


                                        318  1 ********************************************************************************
                                        319  1 *                                                                              *
                                        320  1 *         OUTPUT PARAMETERS FOR THE CMFCT SUBFUNCTION.                         *
                                        321  1 *                                                                              *
                                        322  1 ********************************************************************************


                        000001          323  1 DPACMRTN EQU   DPARTN          RETURN CODE NAME FOR CMFCT
                        000000          324  1 DPACMOK  EQU   X'00'            O.K.NO PROBLEM.
                        000004          325  1 DPACMFE  EQU   X'04'            FORMAL ERROR
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        326  1 *                          -BUFFER NOT WORD-ALIGNED
                                        327  1 *                          -NO BUFFER GIVEN
                                        328  1 *                          -NO LENGTH OF THE BUFFER GIVEN
                                        329  1 *                          -NO TCB ADDRESS GIVEN
                                        330  1 *                          -NO XVT ADDRESS GIVEN
                                        331  1 *                          -NO SYSBASE ADDRESS GIVEN
                                        332  1 *                          -NEITHER A(READ) NOR LINK# GIVEN
                                        333  1 *                          -INVALID SUBFUNCTION CODE
                                        334  1 *                          -INVALID ITN GIVEN
                  000008                335  1 DPAMODE  EQU   X'08'       MODULE ERROR
                  00000C                336  1 DPACMNWA EQU   X'0C'       A(TCB) OR A(XVT) OR A(SYSBASE) NOT
                                        337  1 *                            WORD ALIGNED
                  000010                338  1 DPACMOF  EQU   X'10'       FILE IS NOT OPEN.
                  000014                339  1 DPACMS   EQU   X'14'       SPECIFIED TASK NOT FOUND
                  000018                340  1 DPACMTQN EQU   X'18'       TASK SPECIFICATION NECESSARY
                  00001C                341  1 DPACMILN EQU   X'1C'       INVALID LINK NUMBER
                  000020                342  1 DPACMIND EQU   X'20'       INVALID INDICATOR OF DUMPFILE TYPE
                  000024                343  1 DPACMRNI EQU   X'24'       A(READ) GIVEN BUT NO ITN GIVEN
                  000028                344  1 DPACMOC  EQU   X'28'       O.K. BUFFER FILLED WITH INFORMATION
                                        345  1 *                            BUT INFORMATION IS NOT COMPLETE,
                                        346  1 *                            BECAUSE BUFFER IS TOO SMALL.SUCCESSIVE
                                        347  1 *                            CALL IS NECESARY,WHICH WILL RETURN THE
                                        348  1 *                            NEXT PART OF THE INFORMATION(CALL WITH
                                        349  1 *                            SAME PARAMETERS PLUS FLAG CMSUCC SET)
                  00002C                350  1 DPACMIA  EQU    X'2C'       BUFFER NOT ACCESSABLE IN FULL LENGTH
                  000030                351  1 DPACMPRE EQU    X'30'       ERROR IN PAGE READ ROUTINE
                  000034                352  1 DPACMTS  EQU    X'34'       BUFFER TOO SMALL,CAN NOT EVEN HOLD
                                        353  1 *                            ONE SINGLE RECORD
                  000038                354  1 DPACMNOC EQU    X'38'       NO PROGRAM LOADED
                  00003C                355  1 DPACMNPL EQU    X'3C'       NO CSECT MAP FOUND,BUFFER IS EMPTY
                  000040                356  1 DPACMPND EQU    X'40'       PAGE NOT DUMPED
                  000044                357  1 DPACMERS EQU    X'44'       ERROR IN SYSTEM
                  000048                358  1 DPACMOFL EQU    X'48'       OLD FORMAT OF LOAD-INFORMATION
                  00004C                359  1 DPACMNID EQU    X'4C'       INFORMATION NOT IN DUMP
                  000050                360  1 DPACMIN  EQU    X'50'       PU NOT FOUND
000054 00000000                         361  1 DPACMNRI DC     F'0'        NUMBER OF RETURNED RECORDS
                  000058                362  1 DPACMLGT EQU    *-DPAFCT



                                        363  1 ********************************************************************************
                                        364  1 *                                                                              *
                                        365  1 *            DESCRIPTION OF BUFFER LAYOUT                                      *
                                        366  1 *                                                                              *
                                        367  1 ********************************************************************************
000000                                  368  1 DPACMOUT DSECT                 USE THE CALLER BUFFER
000000 4040404040404040                 369  1 DPACMCSN DC      CL8' '       CSECT NAME
000008 00000000                         370  1 DPACMCSA DC      A(0)         CSECT START ADDRESS
00000C 00000000                         371  1 DPACMCSL DC      F'0'         LENGTH OF THE CSECT
000010 0000000000000000                 372  1 DPACMETD DC      XL16'0'      ETPND INFORMATION
                  000010                373  1                  ORG   DPACMETD  TO FULLFILLED WITH DETAILLED INFO
000010 000000                           374  1 DPACMMVN DC      XL3'0'       VERSION NUMBER OF THE MODUL
000013 00                               375  1 DPACMLVN DC      X'00'        MACRO LIBRARY VERSION NUMBER
000014 404040404040                     376  1 DPACMASD DC      CL6' '       DATE OF ASSEMBLY
00001A 404040404040                     377  1 DPACMJUD DC      CL6' '       JULIAN DATUM
```

```
FLAG LOCTN OBJECT CODE  ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                        000020          378  1 DPACMRCL EQU    *-DPACMCSN    LENGTH OF ONE RECORD


    000058                              379  1 MALIB    DSECT
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                          380  1 ********************************************************************************
                                          381  1 *                                                                              *
                                          382  1 *          INPUT PARAMETERS NEEDED BY THE GET ADDRESS FUNCTION.                *
                                          383  1 *                                                                              *
                                          384  1 ********************************************************************************


                  000029                  385  1           ORG   DPADIV2        CONTINUE PARAMETER INPUT
00002C 00000000                           386  1 DPAGAVA  DC    A(0)           ADDRESS FOR WHICH THE INFORMATION
                                          387  1 *                               SHOULD BE FETCHED (MANDATORY)


                                          388  1 ********************************************************************************
                                          389  1 *                                                                              *
                                          390  1 *          OUTPUT PARAMETERS FOR GAFCT                                         *
                                          391  1 *                                                                              *
                                          392  1 ********************************************************************************


                  000001                  393  1 DPAGARTN EQU   DPARTN
                  000000                  394  1 DPAGAOK  EQU   X'00'          O.K.NO PROBLEM
                  000004                  395  1 DPAGAFE  EQU   X'04'          FORMAL ERROR
                                          396  1 *                               -NO TCB ADDRESS GIVEN
                                          397  1 *                               -NO XVT ADDRESS GIVEN
                                          398  1 *                               -NO SYSBASE ADDRES GIVEN
                                          399  1 *                               -NEITHER A(READ) NOR LINK# GIVEN
                                          400  1 *                               -INVALID SUBFUNCTION NUMBER
                                          401  1 *                               -INVALID ITN GIVEN
                  000008                  402  1 DPAGAME  EQU   X'08'          MODULE ERROR
                  00000C                  403  1 DPAGANWA EQU   X'0C'          A(TCB) OR A(XVT) OR A(SYSBASE) NOT
                                          404  1 *                               WORD ALIGNED
                  000010                  405  1 DPAGAOF  EQU   X'10'          FILE IS NOT OPEN
                  000014                  406  1 DPAGAS   EQU   X'14'          SPECIFIED TASK NOT FOUND
                  000018                  407  1 DPAGATQN EQU   X'18'          TASK QUALIFICATION NECESSARY
                  00001C                  408  1 DPAGAILN EQU   X'1C'          INVALID LINK NUMBER GIVEN
                  000020                  409  1 DPAGAIND EQU   X'20'          INVALID INDICATOR OF DUMPFILE TYPE
                  000024                  410  1 DPAGARNI EQU   X'24'          A(READ) GIVEN BUT NO ITN GIVEN
                  000028                  411  1 DPAGANA  EQU   X'28'          ADDRESS NOT ALLOCATED
                  00002C                  412  1 DPAGAIAF EQU   X'2C'          INPUT ADDRESS IN CONFLICT WITH FLAG
                  000030                  413  1 DPAGAPRE EQU   X'30'          ERROR IN PAGE READ ROUTINE
                  000034                  414  1 DPAGAERS EQU   X'34'          ERROR IN SYSTEM
                  000038                  415  1 DPAGANPL EQU   X'38'          NO PROGRAM LOADED
                  00003C                  416  1 DPAGANID EQU   X'3C'          INFORMATION NOT IN DUMP
                  000040                  417  1 DPAGAPND EQU   X'40'          PAGE NOT DUMPED
000030 4040404040404040                   418  1 DPAGASEC DC    CL8' '         NAME OF THE CSECT .
000038 00000000                           419  1 DPAGASTA DC    A(0)           START ADDRESS OF THE CSECT
00003C 00000000                           420  1 DPAGAREL DC    A(0)           RELATIVE ADDRESS(GIVEN ADDRESS
                                          421  1 *                               MINUS START ADDRESS)
000040 00000000                           422  1 DPAGACSL DC    F'0'           LENGTH OF CSECT
                  000044                  423  1 DPAGALEN EQU   *-DPAFCT       LENGTH OF THE PARAMETER LIST
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                  424  1 ********************************************************************************
                                  425  1 *                                                                              *
                                  426  1 *         ADDITIONAL INPUT PARAMETERS NEEDED FOR PU SUBFUNCTION.               *
                                  427  1 *                                                                              *
                                  428  1 ********************************************************************************


                                  429  1 *                    N O N E


                                  430  1 ********************************************************************************
                                  431  1 *                                                                              *
                                  432  1 *         OUTPUT PARAMETERS OF THE PU SUBFUNCTION.                             *
                                  433  1 *                                                                              *
                                  434  1 ********************************************************************************


                    000001        435  1 DPAPURTN EQU   DPARTN
                    000000        436  1 DPAPUOK  EQU   X'00'          O.K.NO PROBLEM
                    000004        437  1 DPAPUFE  EQU   X'04'          FORMAL ERROR
                                  438  1 *                             -BUFFER ADDRESS NOT WORD-ALIGNED
                                  439  1 *                             -NO BUFFER ADDRESS GIVEN
                                  440  1 *                             -NO BUFFER LENGTH GIVEN
                                  441  1 *                             -ILLEGAL SUBFUNCTION NUMBER
                                  442  1 *                             -NO TCB ADDRESS GIVEN
                                  443  1 *                             -NO XVT ADDRESS GIVEN
                                  444  1 *                             -NO SYSBASE ADDRESS GIVEN
                                  445  1 *                             -NEITHER A(READ) NOR LINK# GIVEN
                                  446  1 *                             -INVALID ITN GIVEN
                    000008        447  1 DPAPUNWA EQU   X'08'          A(TCB)  OR A(XVT) OR A(SYSBASE) NOT
                                  448  1 *                              WORD ALIGNED
                    00000C        449  1 DPAPUOF  EQU   X'0C'          FILE IS NOT OPEN
                    000010        450  1 DPAPUSTN EQU   X'10'          SPECIFIED TASK NOT FOUND
                    000014        451  1 DPAPUTQN EQU   X'14'          TASK QUALIFICATION NECESSARY
                    000018        452  1 DPAPUOC  EQU   X'18'          O.K. BUT BUFFER FILLED WITH
                                  453  1 *                              INFORMATION AND INFORMATION IS NOT
                                  454  1 *                              COMPLETE,SUCCESSIVE CALL NECESSARY
                                  455  1 *                              WITH SAME PARAMETERS,BUT PUSUCC FLAG
                                  456  1 *                              SET.
                    00001C        457  1 DPAPUILN EQU   X'1C'          INVALID LINK NUMBER GIVEN
                    000020        458  1 DPAPUIND EQU   X'20'          INVALID INDICATOR OF DUMPFILE TYPE
                    000024        459  1 DPAPURNI EQU   X'24'          A(READ) GIVEN BUT NO ITN GIVEN
                    000028        460  1 DPAPUIA  EQU   X'28'          BUFFER NOT WRITE ACCESSIBLE IN FULL
                                  461  1 *                              LENGTH.
                    00002C        462  1 DPAPUNOP EQU   X'2C'          NO PU FOUND,BUFFER IS EMPTY
                    000030        463  1 DPAPUTS  EQU   X'30'          BUFFER LENGTH TOO SHORT TO CONTAIN
                                  464  1 *                              ONLY ONE ANSWER.
 000044 00000000                  465  1 DPAPUNRT DC    F'0'           NUMBER OF RETURNED RECORDS
                    000048        466  1 DPAPULGT EQU   *-DPAFCT
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                          467  1 ********************************************************************************
                                          468  1 *                                                                              *
                                          469  1 *          DESCRIPTION OF BUFFER LAYOUT                                        *
                                          470  1 *                                                                              *
                                          471  1 ********************************************************************************


000000                                    472  1 DPAOUTPU DSECT
000000 00000000                           473  1 DPAPUCRI DC    A(0)             POINTER TO CRIA
000004 4040404040404040                   474  1 DPAPUNAM DC    CL41' '          NAME OF PROGRAM UNIT
00002D 404040                             475  1 DPAPUST  DC    CL3' '           PU STATE
                          000004          476  1 DPAPUPRI EQU   DPAUSER        PU IS IN PRIVILEGED STATE
                          000008          477  1 DPAPUNPR EQU   DPASYST        PU IS IN NON PRIVILIGED STATE
                          00002C          478  1 DPAPURCL EQU   *-DPAPUNAM



                                          479  1 ********************************************************************************
                                          480  1 *                                                                              *
                                          481  1 *        THE FOLLOWING EQUATES ARE DONE IN ORDER TO BE ABLE                    *
                                          482  1 *        TO VALIDATE SOME INPUT PARAMETERS                                     *
                                          483  1 *                                                                              *
                                          484  1 ********************************************************************************



                          000040          485  1 DPABOTH  EQU   X'40'     FLAG USED TO SEE IF BOTH PRIVILEGED AND
                                          486  1 *                         NON PRIVILEGED INFORMATION ARE NEEDED
                                          487  1 *
                          0000FD          488  1 DPARESET EQU   X'FD'
                                          489  1 *                         B'11111101' IT IS USED FOR RESETTING THE
                                          490  1 *                         SYSTEM BIT SET IF BOTH WAS SPECIFIED
                                          491  1 *                         NOW THE FIRST CALL DONE IS WITH NON PRIVILEGE
                          000003          492  1 DPALNKL  EQU   3         NUMBER OF BYTES WHICH MUST BE TESTED IN ORDER
                                          493  1 *                         TO VALIDATE THE CALLER GIVEN IND AND ALSO THE
                                          494  1 *                         NUMBER OF BYTES TO BE TRANSFERED FROM A FW TO
                                          495  1 *                         THE ASERP CORRESPONDING ZONE>
                          000003          496  1 DPAITNL  EQU   3         NUMBER OF BYTES WHICH MUST BE TESTED IN
                                          497  1 *                         ORDER TO VALIDATE THE CALLER GIVEN ITN
                          0000F3          498  1 DPAVALFN EQU   X'FF'-DPAGASFT-DPAPUSFT
                                          499  1 *                         THIS FIELD IS USED AS A BINARY MASK OF
                                          500  1 *                         B'11110011' TO VALIDATE THE FUNCTION
                                          501  1 *                         NUMBER WHICH ONLY CAN BE
                                          502  1 *                         B'00000000' OR B'00000100' OR B'00001000'
                                          503  1 *                         OR B'00001100' ALL BITS SETS ARE NOT TESTED!
                          000003          504  1 DPAVALFW EQU   X'03'     THE CORRESPONDING BINARY MASK IS B'00000011'
                                          505  1 *                         WHICH IS THE MASK TO TEST IF THE ADDRESS
                                          506  1 *                         GIVEN BY THE CALLER IS FULLWORD ALIGNED
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                  507  1 *                          THAT MEANS DIVIDABLE BY 4
                          0000DF  508  1 DPAFLAGT EQU   X'FF'-DPASUCC
                                  509  1 *                           B'11101111' IT IS USED IS TO TEST IF A
                                  510  1 *                           IT IS THE FIRST CALL OR A SUCCESSIVE ONE
                          000003  511  1 DPAINDL  EQU   3            THIS IS THE NUMBER OF BYTES TO BE BYPASSED
                                  512  1 *                           BECAUSE GIVEN IS FW AND RECEVED IS A BYTE
                          0000DF  513  1 DPAUSSET EQU   DPAFLAGT B'11011111' IT IS USED TO TEST IF THE FLAG
                                  514  1 *                           IS SET IN THE MEANING OF USER OR SYSTEM
                                  515  1 *                           DUMPFILE ACCESS IS WANTED.WHY NOT USE THE
                                  516  1 *                           FOLLOWING MASK B'11111111'? BECAUSE THE
                                  517  1 *                           FLAG IS ALSO USED FOR SETTING IF FIRST CALL
                          0000D3  518  1 DPAVALFL EQU X'FF'-DPASUCC-DPASYST-DPAUSER
                                  519  1 *                          B'11010011' IN ORDER TO VALIDATE THE VALUE
                                  520  1 *                          OF THE FLAG BECAUSE THE ONLY PERMITTED
                                  521  1 *                          BITS TO BE SET ARE B'00*0**00'.IF OTHERS
                                  522  1 *                          ARE SET ...THERE IS AN ERROR
                          0000FF  523  1 DPARTNT  EQU X'FF'    B'11111111' THESE FIELD IS USED TO SEE
                                  524  1 *                          WETHER THERE IS A NULL RETURN CODE FROM
                                  525  1 *                          AIDSYS05 OR AIDSYS02 OR AIDSYS04 IF
                                  526  1 *                          IT IS NOT NULL,THEN GOTO TRANSLATION OF
                                  527  1 *                          THE RETURNED CODE TO THE CALLER EXPECTED
                                  528  1 *                          ONE



                          000007  529  1 DPALINK# EQU   X'07' THIS FIELD IS USED FRO HANDLING THE MAXIMUM OF
                                  530  1 *                    GULTIG LINK NUMBER.IT IS USED TO SEE WETHER
                                  531  1 *                    THE CALLER HAS GIVEN A VALID LINK NUMBER TO
                                  532  1 *                    US FOR HIS DUMPFILE.THESE NUMBER CAN VARY
                                  533  1 *                    THAT IS THE RAISON WHY IT IS DONE BY THIS WAY
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                   534    SERVE    ASERP DSECTAID                                          02119000
    000000                         535  1 SERVE    DSECT
                                   536  1          IDLKG VER=022
                                   537  2                *,VERSION 022                                      00001300
    000000                         538  2          CNOP  0,4                                                00002800
    000000                         539  2          DS    0F                                                 00003500
                                   540  1 ********************************************************************
                                   541  1 *                                                                  *
                                   542  1 *  ASERP IS THE ONLY INTERFACE BETWEEN AID AND AIDSYS.              *
                                   543  1 *  THE PARAM-LIST CONSISTS OF TWO PARTS: A COMMON                  *
                                   544  1 *  HEADER FOR ALL FUNCTIONS AND THE PARAMETERS FOR                 *
                                   545  1 *  EACH FUNCTION. TO CALL AIDSYS FOR A SERVICE-REQUEST,            *
                                   546  1 *  THE CALLER JUST HAS TO SET SOME HEADER-PARAMS AND               *
                                   547  1 *  ALL NECESSARY PARAMS FOR THAT SPECIFIC FUNCTION.                *
                                   548  1 *  ALL PARAMS OF ANY OTHER FUNCTION MUST NOT BE SET,               *
                                   549  1 *  BECAUSE DOING SO WOULD OVERWRITE THE OTHER PARAMS.              *
                                   550  1 *  A SPECIAL NOTE TO THE HEADER:                                   *
                                   551  1 *  ASACAIDS IS ALWAYS SET BY AIDSYS AND MUST NOT BE                *
                                   552  1 *  ALTERED, BECAUSE THIS FIELD HOLDS THE ADDRESS OF                *
                                   553  1 *  THE ENTRY IN AIDSYS FOR ALL SERVICE-REQUESTS.                   *
                                   554  1 *  ASAFC IS SET BY AIDSYS, TOO, FOR EVERY RETURN TO                *
                                   555  1 *  AID. ASAFCT AND ASASBFCT MUST ALWAYS BE SET BY AID.             *
                                   556  1 *                                                                  *
                                   557  1 *  PARAMS:  I =      PREFIX; A MAXIMUM OF 3 CHARACTERS           *
                                   558  1 *                    IS ALLOWED; DEFAULT IS 'ASA'                *
                                   559  1 *                                                                  *
                                   560  1 *           FCT =    SPECIFIES THE FUNCTION(S) TO BE             *
                                   561  1 *                    SELECTED (WITH COMPLETE HEADER).            *
                                   562  1 *                    DEFAULT IS 'ALL'                            *
                                   563  1 *               = ALL          COMPLETE ASERP WITH ALL           *
                                   564  1 *                              FUNCTIONS; THIS IS                *
                                   565  1 *                              COMPATIBLE WITH V6/V7.0           *
                                   566  1 *               = SETTP        SET TESTPOINTS                    *
                                   567  1 *               = DELTP        DELETE TESTPOINTS                 *
                                   568  1 *               = OUTPUT       DATA OUTPUT                       *
                                   569  1 *               = GETADDR      GET ADDRESS                       *
                                   570  1 *               = OPENDUMP     OPEN DUMPED TASK                  *
                                   571  1 *               = REQM         REQUEST MEMORY                    *
                                   572  1 *               = RELM         RELEASE MEMORY                    *
                                   573  1 *               = CALLSYST     CALL SYSTEM                       *
                                   574  1 *               = CLOSEDMP     CLOSE DUMPFILE                    *
                                   575  1 *               = CLOSEOUT     CLOSE OUTPUT-FILE &               *
                                   576  1 *                              AID-MEMORY-POOLS                  *
                                   577  1 *               = SETSW        SET SWITCHES                      *
                                   578  1 *               = STS          LOAD/UNLOAD STS-MODULE            *
                                   579  1 *               = INFORM       INFORM                            *
                                   580  1 *               = MOVE         DATA MANIPULATION                 *
                                   581  1 *               = HELP         ACCESS HELP-FILE                  *
                                   582  1 *               = TMODE        GET TERMINAL-INFORMATION          *
                                   583  1 *               = LADINF       GET LOADER-INFORMATION            *
                                   584  1 *               = ALPOINT      CHANGE ACTIONLISTPOINTER          *
                                   585  1 *               = SYSEDT       SYSTEM - EDIT                     *
                                   586  1 *               = DATE         GET DATE                          *
                                   587  1 *               = HWI          HARDWARE-INFORMATION              *
                                   588  1 *               = HIA          HARDWARE-INFORMATION F.A.         *
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        589  1 *                = SAVE       TABELLENSICHERUNG        *
                                        590  1 *                                                     *
                                        591  1 *             INF = YES     DESCRIPTION OF ASERP WILL  *
                                        592  1 *                           BE PRINTED OUT (DEFAULT).  *
                                        593  1 *                 = NO      NO PRINT-OUT OF DESCRIPTION *
                                        594  1 *                                                     *
                                        595  1 *****************************************************
000000                                  596  1 ASASERVE DS    0F                 USER INTERFACE FOR AID TO AIDSYS
                                        597  1 ************************************************************************
                                        598  1 **                                                                    **
                                        599  1 **          GENERAL EQUATES FOR AIDSYS-INTERNAL USE ONLY              **
                                        600  1 **                                                                    **
                                        601  1 ************************************************************************
                  000010                602  1 ASADUMP  EQU   X'10'            ZUGRIFF AUF DUMPDATEI
                  000004                603  1 ASAPE    EQU   X'04'            ANZEIGE FUER FORMALER FEHLER
                  000000                604  1 ASAITN   EQU   X'00'            NICHT VERWENDET
                  000000                605  1 ASATSN   EQU   X'00'            NICHT VERWENDET
                  000004                606  1 ASAUQUAL EQU   X'04'            EINGABE IST UEBERQUALIFIZIERT
                  000080                607  1 ASAWRO   EQU   X'80'            WRITE INTO R/O-PAGE
                  000022                608  1 ASAVERS# EQU   X'022'           ACTUAL MACRO-VERSION#

                                        609  1 ************************************************************************
                                        610  1 **                                                                    **
                                        611  1 **           STANDARD - H E A D E R   FOR ALL FUNCTIONS               **
                                        612  1 **                                                                    **
                                        613  1 ************************************************************************
000000 00000000                         614  1 ASACAIDS DC    A(0)              A(LINK-CODING AID --> AIDSYS)
000004 00000000                         615  1 ASACALL1 DC    A(0)              FREE FOR CALLER
000008 00000000                         616  1 ASACALL2 DC    A(0)              FREE FOR CALLER
00000C 00000000                         617  1 ASAPC    DC    A(0)              PC OF INTERRUPTED PROGRAM
                  000001                618  1 ASANOPCB EQU   X'000001'         FALLS 'ASAPC'=X'00000001', DANN IST
                                        619  1 *                               KEIN PROGRAMM GELADEN
000010 22                               620  1 ASAVERS  DC    AL1(ASAVERS#)     MACRO-VERSION#
000011 00                               621  1 ASAFCT   DC    X'00'             FUNKTION; DIE EINZELNEN FUNKTIONS-
                                        622  1 *                               CODES STEHEN JEWEILS AM ANFANG DER
                                        623  1 *                               FUNKTIONSBESCHREIBUNG
000012 00                               624  1 ASASBFCT DC    X'00'             SUBFUNKTION; SIEHE BEI DEN EINZELNEN
                                        625  1 *                               HAUPTFUNKTIONEN BZGL. DES CODES
000013 00                               626  1 ASARETRN DC    X'00'             RUECKKEHR-CODE
                  000014                627  1 ASAHEAD  EQU   *-ASASERVE       LENGTH OF HEADER
                  000014                628  1 ASALABEL EQU   *

                                        629  1 ************************************************************************
                                        630  1 **                                                                    **
                                        631  1 **       S E T   T E S T P O I N T                                    **
                                        632  1 **       -------------------------                                    **
                                        633  1 **  DIESER SERVICE DIENT ZUM SETZEN VON AID-TESTPUNKTEN (SVC 129),   **
                                        634  1 **  ZUM ANMELDEN EINES MASCHINEN-TRACE UND VON ASYNCHRONEN           **
                                        635  1 **  EREIGNISSEN.                                                     **
                                        636  1 **                                                                    **
                                        637  1 ************************************************************************
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                          000014          638  1          ORG   ASALABEL

                                          639  1 ********************************************************************************
                                          640  1 **              HEADER - PARAMETER                                            **
                                          641  1 ********************************************************************************
                          000000          642  1 ASAST    EQU   X'00'            FUNCTION=SET TESTPOINT
                          000000          643  1 ASASTL   EQU   X'00'            SUBFUNCTION=EXPLICIT LOCATION
                          000004          644  1 ASASTE   EQU   X'04'            SUBFUNCTION=EVENTS (ANY,SVC,...)
                                          645  1 *                              & MACHINE-TRACE
                          000008          646  1 ASASTFT  EQU   X'08'            SUBFUNCTION=STATEMENT-TRACE
                          000008          647  1 ASASTMAX EQU   X'08'            MAX. # OF SUBFUNCTION

                                          648  1 ********************************************************************************
                                          649  1 **                AUFRUF - PARAMETER                                          **
                                          650  1 ********************************************************************************
000014                                    651  1 ASASTLOC DS    0F          L:   LOC OF EXPL TESTPOINT
000014                                    652  1 ASASTEVT DS    0C          E:   EVENT CLASS
                          000040          653  1 ASASTCL0 EQU   X'40'            MACHINE-TRACE
                          000020          654  1 ASASTCL1 EQU   X'20'            AIDSYS-CLASS1: SVC-INTERRUPTS
                                          655  1 *                              ERROR-CODE X'50'
                          000010          656  1 ASASTCL2 EQU   X'10'            AIDSYS-CLASS2: TERMINATION
                                          657  1 *                              - EVENT-CODES X'00' - X'02'
                          000008          658  1 ASASTCL3 EQU   X'08'            AIDSYS-CLASS3: ERROR-FLAG
                                          659  1 *                              - EVENT-CODES: X'48'
                                          660  1 *                              X'54'-X'78'
                          000004          661  1 ASASTCL4 EQU   X'04'            AIDSYS-CLASS4: ILLSTXIT
                                          662  1 *                              - EVENT-CODES: X'03' - X'05'
                                          663  1 *                                             X'0C'
                          000002          664  1 ASASTCL5 EQU   X'02'            AIDSYS-CLASS5: STXIT
                                          665  1 *                              - EVENT-CODES: X'06'
                                          666  1 *                                             X'44'
                                          667  1 *                                             X'4C'
                          000001          668  1 ASASTCL6 EQU   X'01'            AIDSYS-CLASS6: LPOV/LINK
                                          669  1 *                              - EVENT-CODES: X'07'
                          000080          670  1 ASASTCL7 EQU   X'80'            AIDSYS-KLASSE 7: AUDIT

000014 00000000                           671  1 ASASTALM DC    A(0)        FT:  A(LMIR); KANN AUS AIDSYS-DESCRIPTOR
                                          672  1 *                              ENTNOMMEN WERDEN
000018 00000000                           673  1 ASASTTRC DC    A(0)        FT:  A(TRACE-PUNKT-PUFFER)
00001C 00000000                           674  1 ASASTTLN DC    A(0)        FT:  ANZAHL DER SAETZE IM TRACEPUNKT-
                                          675  1 *                              PUFFER INCLUSIVE ALLER FOLGEAUFRUFE.
                                          676  1 *                              FALLS EIN FORTSETZUNGSAUFRUF VORGE-
                                          677  1 *                              SEHEN IST, MUSS DIE ANZEIGE 'STLNK'
                                          678  1 *                              GESETZT WERDEN. BEI FOLGEAUFRUFEN
                                          679  1 *                              WIRD 'STTLN' NICHT MEHR BETRACHTET.
000020 0000                               680  1 ASASTITN DC    H'0'        ALL: (OPTIONAL) ITN. X'0000' BEDEUTET
                                          681  1 *                              ZUGRIFF AUF DEN DEFAULT-TASK.
000024 00000000                           682  1 ASASTTSN DC    A(0)        ALL: (OPTIONAL) TSN. A(0) BEDEUTET
                                          683  1 *                              ZUGRIFF AUF DEN DEFAULT-TASK.
000028 00                                 684  1 ASASTFB  DC    X'00'       ALL: FLAGBYTE
                          000000          685  1 ASASTFSN EQU   ASATSN           NICHT VERWENDET
                          000000          686  1 ASASTFTN EQU   ASAITN           NICHT VERWENDET
                          000040          687  1 ASASTALL EQU   X'40'            ALL TASKS MUST REACT
                          000020          688  1 ASASTEXC EQU   X'20'            EXCLUDE TASK SPECIFIED BY STTSK
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                          000010          689  1 ASASTLNK EQU   X'10'            TRACE-POINT-LIST WILL BE CONTINUED
                          000008          690  1 ASASTOWN EQU   X'08'            TASK THAT SETS TP MUST ALSO REACT
                          000002          691  1 ASASTPH  EQU   X'02'            STLOC IST REALE ADRESSE
                          000001          692  1 ASASTP2  EQU   X'01'      EVT:  SET: EVENT IS FOR STATE=P2
                                          693  1 *                              RESET: EVENT IS FOR STATE=P1
                                          694  1 *                              (WIRD VORLAEUFIG NUR FUER EREIGNIS-
                                          695  1 *                              KLASSE 'SVC' AUSGEWERTET)
000029 00                                 696  1 ASASTTSK DC    XL1'00'    ALL:  TASK THAT HAS TO REACT ON TP
00002A                                    697  1 ASASTLL  DS    0CL3             NOT USED
00002A 00                                 698  1 ASASTTYP DC    X'00'      FT:   TRACE-KLASSE; JEDE KLASSE IST DURCH
                                          699  1 *                              EIN BIT GEKENNZEICHNET. MINDESTENS
                                          700  1 *                              EIN BIT MUSS GESETZT SEIN.
00002B 00                                 701  1 ASASTFB2 DC    X'00'    L/FT:  FLAGBYTE 2 (OPTIONAL)
                          000080          702  1 ASASTWRO EQU   ASAWRO           IGNORE READ-ONLY-PROTECTION
00002C 00000000                           703  1 ASASTUAD DC    A(0)       ALL:  A(AKTIONSLISTE)


                                          704  1 ********************************************************************************
                                          705  1 **                RUECKKEHR - PARAMETER                           **
                                          706  1 ********************************************************************************
                          000013          707  1 ASASTRTN EQU   ASARETRN   ALL:  RETURN CODE
                          000000          708  1 ASASTOK  EQU   X'0'      ALL:  ALL OK
                          000004          709  1 ASASTFE  EQU   X'4'      ALL:  FORMALER FEHLER.
                                          710  1 *                              - AUFRUFER DARF DIESE FUNKTION
                                          711  1 *                                NICHT AUFRUFEN (NUR AID)
                                          712  1 *                              - UNBEKANNTE SUBFUNKTION
                                          713  1 *                              - UNDEFINIERTE EREIGNISKLASSE
                                          714  1 *                              - KEIN REAGIERENDER TASK ANGEGEBEN
                                          715  1 *                              - ITN GROESSER ALS 255
                                          716  1 *                              - KEINE AKTIONSLISTE ANGEGEBEN
                          000008          717  1 ASASTTTS EQU   X'8'      ALL:  TEST PRIVILEGIERUNG IST ZU KLEIN.
                                          718  1 *                              DIE MAX. USERBERECHTIGUNG WUERDE
                                          719  1 *                              ABER AUSREICHEN
                          00000C          720  1 ASASTTAS EQU   X'C'      ALL:  TEST PRIVILEGIERUNG IST ZU KLEIN.
                                          721  1 *                              AUCH DIE MAX. BERECHTIGUNG REICHT
                                          722  1 *                              NICHT AUS
                          000010          723  1 ASASTADE EQU   X'10'       L:   TESTPUNKT-ADRESSE NICHT ALLOKIERT
                          000014          724  1 ASASTENA EQU   X'14'       E:   EREIGNIS NICHT ERLAUBT, DA 'IDA'
                                          725  1 *                              SCHON EIN EREIGNIS GESETZT HAT.
                          000018          726  1 ASASTNFI EQU   X'18'      ALL:  ITN NICHT AKTIV
                          00001C          727  1 ASASTODD EQU   X'1C'       L:   TESTPUNKT-ADRESSE NICHT AUF HALB-
                                          728  1 *                              WORTGRENZE.
                          000020          729  1 ASASTTPE EQU   X'20'       L:   TESTPOINT EXISTS ALREADY,A(1ST AL)
                                          730  1 *                              IS IN ASASTWRO
                          000024          731  1 ASASTMNF EQU   X'24'     L/FT:MODUL NICHT GEFUNDEN
                          000028          732  1 ASASTNMA EQU   X'28'      ALL:  KEIN SPEICHER VERFUEGBAR.
                          00002C          733  1 ASASTNFT EQU   X'2C'      ALL:  TASK MIT ANGEGEBENER TSN IST
                                          734  1 *                              NICHT AKTIV
                          000030          735  1 ASASTNT  EQU   X'30'       L:   EIN ANDERER TASK BLOCKIERT ZUGRIFF
                                          736  1 *                              AUF TESTPUNKT-VERWALTUNG.
                          000034          737  1 ASASTNOT EQU   X'34'      ALL:  ANFORDERUNG NICHT ERFUELLT.
                                          738  1 *                              SIEHE 'STFBR'
                          000038          739  1 ASASTREJ EQU   X'38'      ALL:  FREMDTASK-ZUGRIFF NOCH NICHT
                                          740  1 *                              IMPLEMENTIERT
                          00003C          741  1 ASASTIDT EQU   X'3C'       L:   AID-TESTPUNKT KANN NICHT GESETZT
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        742  1 *                                  WERDEN, DA SCHON 'IDA'-TESTPUNKT
                                        743  1 *                                  AN ANGEGEBENER ADRESSE
                          000040        744  1 ASASTICL EQU   X'40'        FT:   ERSTER AUFRUF DER SUBFKT. 'TFT'
                                        745  1 *                                  UND 'STTLN' IST NICHT GESETZT.
                          000044        746  1 ASASTTNA EQU   X'44'        L/FT: TPLIST NOT ALLOCATED
                          000048        747  1 ASASTVRR EQU   X'48'        ALL:  VALIDATION-ERROR
                          00004C        748  1 ASASTPHY EQU   X'4C'        ALL:  ZUGRIFF MIT REALER ADRESSE NICHT
                                        749  1 *                                  MOEGLICH
                          000050        750  1 ASASTIRO EQU   X'50'        L/FT: ILLEGAL WRITE-ACCESS OF READ-ONLY PAGE

000030                                  751  1 ASASTXXX DS    0X
000030 00                               752  1 ASASTFBR DC    XL1'00'      ALL:  FLAG BYTE
                          000080        753  1 ASASTRCT EQU   X'80'        ALL:  REACTING TASK(S)-INDICATOR IS ...
                                        754  1 *                                  IN CONFLICT WITH INDICATOR OF TP
                          000040        755  1 ASASTOTK EQU   X'40'        L:    TP EXISTS ALREADY AND WAS SET BY
                                        756  1 *                                  ANOTHER TASK.
                          000020        757  1 ASASTNPL EQU   X'20'        E:    ALL EVENTS REJECTED, BECAUSE
                                        758  1 *                                  THERE IS NO PROGRAM LOADED
                          000010        759  1 ASASTIDA EQU   X'10'        E:    MACHINE-TRACE REJECTED, BECAUSE
                                        760  1 *                                  THERE IS A PARALLEL IDA-TRACE
                          000004        761  1 ASASTQUL EQU   ASAUQUAL     ALL:  UEBERQUALIFIZIERTE EINGABE
000034 00000000                         762  1 ASASTWRD DC    7A(0)        ALL:  A(ACTIONLISTS). IF EVENTS ARE TO BE
                                        763  1 *                                  SET, THEN 1ST WORD REFERS TO CLASS1,
                                        764  1 *                                  THE N-TH WORD TO CLASS N. OTHERWISE
                                        765  1 *                                  ONLY 1ST WORD WILL BE SET.
000050 00000000                         766  1 ASASTCNT DC    A(0)         FT:   FOR TRACE ONLY; #(TRAPCODES), THAT
                                        767  1 *                                  COULD NOT GET SET
                          000024        768  1 ASASTLEN EQU   *-ASASTXXX         LENGTH(RET.PARAMS)



                                        769  1 ********************************************************************
                                        770  1 **                                                                **
                                        771  1 **              D E L E T E   T E S T P O I N T                   **
                                        772  1 **              -------------------------------                   **
                                        773  1 **  MIT DIESEM SERVICE KANN EIN AID-TESTPUNKT (SVC 129), EIN ODER  **
                                        774  1 **  MEHRERE STATEMENTTRACE-KLASSEN, DER MASCHINENTRACE ODER EIN    **
                                        775  1 **  ODER MEHRERE EREIGNISKLASSEN GELOESCHT WERDEN.                 **
                                        776  1 **                                                                **
                                        777  1 ********************************************************************
                          000014        778  1          ORG   ASALABEL

                                        779  1 ********************************************************************
                                        780  1 **             HEADER - PARAMETER                                 **
                                        781  1 ********************************************************************
                          000004        782  1 ASADT    EQU   X'04'          ALL:  FUNCTION = DELETE TESTPOINT
                          000000        783  1 ASADTL   EQU   X'00'          L:    SUBFUNCTION = EXPLICIT LOCATION
                          000004        784  1 ASADTE   EQU   X'04'          E:    SUBFUNCTION = EVENTS (ANY,SVC,..)
                          000008        785  1 ASADTFT  EQU   X'08'          FT:   SUBFUNCTION = FULLTRACE
                          000008        786  1 ASADTMAX EQU   X'08'                MAX. # OF SUBFUNCTIONS

                                        787  1 ********************************************************************
                                        788  1 **             AUFRUF - PARAMETER                                 **
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        789  1 ********************************************************************************
000014 00000000                         790  1 ASADTLOC DC    A(0)        L:   LOC OF EXPL TESTPOINT
000018 00                               791  1 ASADTEVT DC    X'00'       E:   EVENT-CLASS
000019 00                               792  1 ASADTCTM DC    X'00'       FT:  TRACE-TYPE
00001A 0000                             793  1 ASADTITN DC    H'0'        ALL: (OPTIONAL) ITN. X'0000' BEDEUTET
                                        794  1 *                              ZUGRIFF AUF DEN DEFAULT-TASK.
00001C 00000000                         795  1 ASADTTSN DC    A(0)        ALL: (OPTIONAL) TSN. A(0) BEDEUTET ZUGRIFF
                                        796  1 *                              AUF DEN DEFAULT-TASK
000020 00                               797  1 ASADTFB  DC    X'00'       ALL: FLAG BYTE
                  000000                798  1 ASADTITN EQU   ASAITN           NICHT VERWENDET
                  000000                799  1 ASADTTSN EQU   ASATSN           NICHT VERWENDET
                  000040                800  1 ASADTALL EQU   X'40'            NOT USED
                  000020                801  1 ASADTPH  EQU   X'20'       ALL: 'DTLOC' IST REALE ADRESSE
                  000001                802  1 ASADTP2  EQU   X'01'       E:   SET:   EVENT IS FOR STATE=P2
                                        803  1 *                              RESET: EVENT IS FOR STATE=P1
000024 00000000                         804  1 ASADTALM DC    A(0)        FT:  A(LMIR) FOR TRACE-FCT


                                        805  1 ********************************************************************************
                                        806  1 **              RUECKKEHR - PARAMETER                                    **
                                        807  1 ********************************************************************************
                  000013                808  1 ASADTRTN EQU   ASARETRN    ALL: RETURN CODE
                  000000                809  1 ASADTGK  EQU   X'00'       ALL: ALL O.K., USER WORD IN DTWRD
                  000004                810  1 ASADTFE  EQU   X'04'       ALL: FORMALER FEHLER.
                                        811  1 *                              - AUFRUFER IST NICHT AID.
                                        812  1 *                              - UNBEKANNTER SUBFKT-CODE
                                        813  1 *                              - ITN GROESSER ALS 255
                                        814  1 *                              - FREMDTASKZUGRIFF
                                        815  1 *                              - SUBFKT = 'E' UND KEINE EREIGNIS
                                        816  1 *                                KLASSE ANGEGEBEN
                  000008                817  1 ASADTTPE EQU   X'08'       L/FT:LOC/TRACE DOES NOT EXIST
                  00000C                818  1 ASADTNA  EQU   X'0C'       L:   TASK IS NOT ALLOWED TO DELETE TP
                  000010                819  1 ASADTSNR EQU   X'10'       L:   TP DELETED, BUT SOURCE COULD NOT
                                        820  1 *                              BE RESTORED (NO TRAP SET)
                  000014                821  1 ASADTNFI EQU   X'14'       ALL: ITN/TSN NOT FOUND
                  000018                822  1 ASADTTTS EQU   X'18'       ALL: TESTPRIVILEGE TOO SMALL
                  00001C                823  1 ASADTTAS EQU   X'1C'       ALL: TESTPRIVILEGE TOO SMALL IN ANY CASE
                  000020                824  1 ASADTPHY EQU   X'20'       L:   REALE ADRESSE IST NICHT ERLAUBT

000028                                  825  1 ASADTXXX DS    0X
000028 00                               826  1 ASADTHEX DC    X'00'       E:   FLAGBYTE WITH SAME LAYOUT AS DTEVT.
                                        827  1 *                              THE FLAGGED EVENTS WERE NOT SET.
000029 00                               828  1 ASADTRFB DC    X'00'       E:   FLAGBYTE WITH SAME LAYOUT AS DTEVT.
                                        829  1 *                              THE FLAGGED EVENTS COULD NOT BE
                                        830  1 *                              REMOVED.
                                        831  1 *                              THE FLAGGED EVENTS WERE NOT SET.
00002C 00000000                         832  1 ASADTAAL DC    7A(0)       ALL: ADDRESS OF 1ST ACTION-LIST
                                        833  1 *                    IF EVENTS GOT REMOVED, THERE WILL BE RETURNED
                                        834  1 *                    THE ADDRESS(ACTIONLIST) FOR EACH EVENT.
000048 00                               835  1 ASADTFB2 DC    X'00'       ALL: ANZEIGENBYTE
                  000004                836  1 ASADTQUL EQU   ASAUQUAL    ALL: UEBERQUALIFIZIERTE EINGABE
                  000021                837  1 ASADTLEN EQU   *-ASADTXXX        LENGTH(RET.PARAMS)
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                    838  1 ********************************************************************************
                                    839  1 **                                                                            **
                                    840  1 **                    D A T A    O U T P U T                              **
                                    841  1 **                    ----------------------                              **
                                    842  1 **  MIT DIESEM SERVICE KANN EIN LOGISCHER SATZ AUF EINES ODER               **
                                    843  1 **  MEHRERE AUSGABEMEDIEN GLEICHZEITIG AUSGEGEBEN WERDEN. AUSSERDEM        **
                                    844  1 **  KOENNEN MESSAGES AUS DEM MSG-FILE AUF 'SYSOUT' ODER DIE HAUPT-         **
                                    845  1 **  KONSOLE AUSGEGEBEN WERDEN.                                             **
                                    846  1 **  FALLS CONSOL-I/O EINGESTELLT IST (SERVICE 'SET SWITCH'), ERFOLGT       **
                                    847  1 **  JEDE FUER SYSOUT BESTIMMTE AUSGABE AUF DIE HAUPT-KONSOLE.              **
                                    848  1 **                                                                            **
                                    849  1 ********************************************************************************
                    000014          850  1          ORG   ASALABEL

                                    851  1 ********************************************************************************
                                    852  1 **                  HEADER - PARAMETER                                    **
                                    853  1 ********************************************************************************
                    000008          854  1 ASADO    EQU   X'08'        ALL: FUNCTION = DATA OUTPUT
                    000000          855  1 ASADOMAX EQU   X'00'             MAX. # OF SUBFUNCTION

                                    856  1 ********************************************************************************
                                    857  1 **                 AUFRUF - PARAMETER                                     **
                                    858  1 ********************************************************************************
   000014 00                        859  1 ASADOMED DC    X'00'              MEDIUM, INTO WHICH THE OUTPUT IS DONE
                    000001          860  1 ASADOHC  EQU   X'01'        HC:  HARDCOPY
                    000002          861  1 ASADOFIL EQU   X'02'        FIL: FILE, SEE DOFNR
                    000004          862  1 ASADOMEM EQU   X'04'        MEM: MEMORY-POOL, SEE DOMN
                    000008          863  1 ASADOTER EQU   X'08'        TER: SYSOUT
                    000010          864  1 ASADOPRT EQU   X'10'        PRT: SYSLST
                    000020          865  1 ASADOMSG EQU   X'20'        MSG: MSG, NUMBER SEE DOMGN, THIS
                                    866  1 *                             BIT IS EXCLUSIVE
   000015 00                        867  1 ASADOFNR DC    X'00'        FIL: NUMBER OF FILES: LEFTMOST BIT
                                    868  1 *                             IS FILE #0. A MAXIMUM OF 8 FILES
                                    869  1 *                             IS POSSIBLE. AT LEAST 1 FILE
                                    870  1 *                             MUST BE GIVEN
   000016 00                        871  1 ASADOMN  DC    X'00'        MEM: # OF MEM'S
                                    872  1 *                             AT LEAST 1 MUST BE GIVEN.
                                    873  1 *                             LEFTMOST BIT IS MEM #0
   000018 00000000                  874  1 ASADOADR DC    A(0)        ALL BUT MSG: ADDR. OF V-FORMATED OUTPUT
                                    875  1 *                             ADRESSE MUSS HALBWORTAUSGERICHTET SEIN
   00001C 00                        876  1 ASADOIND DC    X'00'       ALL BUT MSG:INDICATOR BYTE

                    000018          877  1          ORG   ASADOADR
   000018 00000000                  878  1 ASADOMGN DC    A(0)        MSG: MESSAGE ID
   00001C 00                        879  1 ASADOBC  DC    X'00'       MSG: FLAGBYTE
                    000000          880  1 ASADONIL EQU   X'00'       MSG: NO INDICATORS
                    000080          881  1 ASADORPE EQU   X'80'       MSG: REPLY EXPECTED
                    000040          882  1 ASADOCO  EQU   X'40'       MSG: OUTPUT TO CONSOLE
   00001D 00                        883  1 ASADOIN  DC    X'00'       MSG: NUMBER OF INSERTS
   00001E 0000                      884  1          DC    XL2'00'     MSG: NOT USED
   000020 00                        885  1 ASADOSRP DC    X'00'       MSG: SIZE OF REPLY (OPTIONAL - ABER FALLS
                                    886  1 *                            REPLY EXPECTED, MUSS LAENGE >0 SEIN)
   000021 000000                    887  1 ASADOARP DC    AL3(0)      MSG: ADDRESS(REPLY) (OPTIONAL- ABER FALLS
                                    888  1 *                            REPLY EXPECTED,MUSS ADRESSE HALBWORTAUSGERICHTET SEIN)
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000024 00000000                      889  1 ASADOINS DC    15A(0)       MSG: MAX. 15 INSERTS. (OPTIONAL)
                                         890  1 *                                1ST BYTE HOLDS SIZE(INSERT)
                                         891  1 *                                NEXT 3 BYTES A(INSERT)


                                         892  1 ********************************************************************************
                                         893  1 **              RUECKKEHR - PARAMETER                                     **
                                         894  1 ********************************************************************************
                      000013             895  1 ASADORTN EQU   ASARETRN     ALL: RETURN CODE
                      000000             896  1 ASADOOK  EQU   X'0'         ALL: ALL O.K.
                      000004             897  1 ASADOFE  EQU   X'4'         ALL: FORMALER FEHLER
                                         898  1 *                                - STRINGLAENGE < 5
                                         899  1 *                                - AUSGABE IN MEMORY-POOLS
                                         900  1 *                                - A(AUSGABESTRING) NICHT HALBWORT-
                                         901  1 *                                  AUSGERICHTET
                                         902  1 *                                - A(AUSGABESTRING) NICHT ALLOKIERT
                                         903  1 *                                - A(MSG-INSERT) NICHT ALLOKIERT
                                         904  1 *                                - A(MSG-ANTWORT-PUFFER) NICHT
                                         905  1 *                                  ALLOKIERT
                                         906  1 *                                - FALLS REPLY EXPECTED:
                                         907  1 *                                  A(REPLY) NICHT HALBWORT-
                                         908  1 *                                  AUSGERICHTET
                      000008             909  1 ASADOIMS EQU   X'8'         MSG: ERROR IN MESSAGE-PARAMS
                      00000C             910  1 ASADOBT  EQU   X'C'         MSG: NON-CONVERSATIONAL USER ASKED FOR
                                         911  1 *                                REPLY
                      000010             912  1 ASADOAIO EQU   X'10'        MSG: ABNORMAL I/O TERMINATION
                      000014             913  1 ASADOEOM EQU   X'14'        ALL BUT MSG: ERROR ON MEDIUM, SEE DOMER
                      000018             914  1 ASADONOM EQU   X'18'        ALL: NO MEDIUM DEFINED
                      00001C             915  1 ASADOMNX EQU   X'1C'        MSG: MSG BIT NOT SET EXCLUSIVELY
                      000020             916  1 ASADONOF EQU   X'20'        FIL: NO FILE# GIVEN
                      000024             917  1 ASADONMM EQU   X'24'        MEM: NO MEM# GIVEN
                      000028             918  1 ASADOCNO EQU   X'28'        FIL: FILE COULD NOT BE OPENED.
                                         919  1 *                                SEE "DOFMN" FOR FILE# AND 'DOERR'
                                         920  1 *                                FOR DMS-RETURNCODE
                      00002C             921  1 ASADONT  EQU   X'2C'        FIL: FCB-TYPE NOT SUPPORTED ("DOFMN")
                      000030             922  1 ASADOFIX EQU   X'30'        FIL: RECORDFORM IS NOT 'V'
    000060                               923  1 ASADOXXX DS    0C
    000060 00                            924  1 ASADOMER DC    X'00'        ALL: MEDIUM WITH ERROR, LAYOUT AS
                                         925  1 *                                DOMED, FILE/MEM # IN DOFMN
    000061 00                            926  1 ASADOFMN DC    X'00'        FIL/MEM: FILE/MEM #, IF THERE ANY ERROR
    000062 00                            927  1 ASADOFS  DC    X'00'        TER: INDICATOR FOR TERMINAL OVERFLOW
                      000080             928  1 ASADOOVF EQU   X'80'        TER: TERMINAL OVERFLOW
                      000040             929  1 ASADOCTO EQU   X'40'        TER: CONTINUE OUTPUT
                      000020             930  1 ASADONXO EQU   X'20'        TER: TERMINATE OPERAND; NEXT OPERAND
                      000010             931  1 ASADOTXC EQU   X'10'        TER: TERMINATE COMMAND
                      000008             932  1 ASADOTRM EQU   X'08'        TER: TERMINATE ACTIONLIST
                      000004             933  1 ASADOUPD EQU   X'04'        TER: UPDATE
    000064 00000000                      934  1 ASADOUBF DC    A(0)         TER: A(BUFFER WITH UPDATE STRING)
    000068 0000                          935  1 ASADOERR DC    H'0'         FIL: DMS-ERROR-CODE, FALLS RTN='DOCNO'
                      00000A             936  1 ASADOLEN EQU   *-ASADOXXX        LENGTH(RET.PARAM)


                                         937  1 ********************************************************************************
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        938  1 **                                                                  **
                                        939  1 **                  S Y S T E M  -  E D I T                         **
                                        940  1 **                  -----------------------                         **
                                        941  1 **        DRUCKAUFBEREITUNG SYSTEMSPEZIFISCHER TABELLEN              **
                                        942  1 **                                                                  **
                                        943  1 ********************************************************************
                 000014                 944  1          ORG   ASALABEL
                                        945  1 ********************************************************************
                                        946  1 **           HEADER - PARAMETER                                     **
                                        947  1 ********************************************************************
                 00000C                 948  1 ASASE    EQU   X'0C'             FUNKTION = SYSTEM-EDIT
                 000000                 949  1 ASASEINF EQU   X'00'             SUBFUNKTION = NUR INFORMIEREN
                 000004                 950  1 ASASEEDT EQU   X'04'             SUBFUNKTION = TABELLEN AUFBEREITEN UND
                                        951  1 *                                        IN PUFFER UEBERTRAGEN
                 000004                 952  1 ASASEMAX EQU   X'04'             MAX. NUMMER EINER SUBFUNKTION

                                        953  1 ********************************************************************
                                        954  1 **             AUFRUF - PARAMETER                                   **
                                        955  1 ********************************************************************
000014 00                               956  1 ASASEKEY DC    X'00'       ALL: AIDSYS-INTERNE VERSCHLUESSELUNG DES
                                        957  1 *                              KEYWORDS. WIRD VON AIDSYS BEI AUFRUF
                                        958  1 *                              DER INFORMIERE-FUNKTION HIER ABGELEGT.
                                        959  1 *                              KANN BEI AUFRUF MITTELS 'ASASEEDT'
                                        960  1 *                              ANGEGEBEN WERDEN. IST BEI 'ASASEEDT'
                                        961  1 *                              SOWOHL 'ASASEKEY' ALS AUCH 'ASASESTR'
                                        962  1 *                              ANGEGEBEN, WIRD 'ASASESTR' IGNORIERT.
                 000000                 963  1 ASASENOK EQU   X'00'       ALL: KEINE KEY# GEGEBEN
                 000004                 964  1 ASASESTK EQU   X'04'       ALL: STACK
                 000004                 965  1 ASASEPCB EQU   X'04'       ALL: PCB
                 000008                 966  1 ASASEPL  EQU   X'08'       ALL: PCBLST
                 00000C                 967  1 ASASEAU1 EQU   X'0C'       ALL: P1 AUDIT
                 000010                 968  1 ASASEAU2 EQU   X'10'       ALL: P2 AUDIT
                 000014                 969  1 ASASETT  EQU   X'14'       ALL: TT    (TRACE TABLE)
                 000018                 970  1 ASASETSK EQU   X'18'       ALL: TASK
                 00001C                 971  1 ASASEQU  EQU   X'1C'       ALL: QUEUE
                 000020                 972  1 ASASEPND EQU   X'20'       ALL: PEND
                 000024                 973  1 ASASEALL EQU   X'24'       ALL: ALL
                 000028                 974  1 ASASEFTT EQU   X'28'       ALL: FULL TRACE TABLE
                 000028                 975  1 ASASEKMX EQU   X'28'            MAXIMALE KEY#

000015 E2E3D9C9D5C74040                 976  1 ASASESTR DC    CL8'STRING' ALL: %-LOSES SCHLUESSELWORT. MUSS BEI
                                        977  1 *                              INFORMIERE-FUNKTION GESETZT SEIN.
                                        978  1 *                              WIRD BEI EDIT-FUNKTION IGNORIERT,
                                        979  1 *                              FALLS 'ASASEKEY' GESETZT IST.
00001D 00                               980  1 ASASEINX DC    X'00'       EDT: WAHLWEISE: INDEX FUER DEN KEY
00001E 00                               981  1 ASASEFB  DC    X'00'       EDT: INDIKATOR
                 000000                 982  1 ASASEFIT EQU   ASAITN            NICHT AUSGEWERTET
                 000000                 983  1 ASASEFTS EQU   ASATSN            NICHT AUSGEWERTET
                 000040                 984  1 ASASESYS EQU   X'40'       EDT: SCHLUESSELWORT SOLL AUF SYSTEMADRESS-
                                        985  1 *                              RAUM ANGEWENDET WERDEN.
                 000020                 986  1 ASASECNT EQU   X'20'       EDT: FOLGEAUFRUF DER LETZTEN EDIT-FUNKTION
                 000010                 987  1 ASASEDP  EQU   ASADUMP    EDT: ZUGRIFF AUF DUMPFILE
                 000002                 988  1 ASASESTB EQU   X'02'       EDT: NUR ORIGINALTABELLE GEWUENSCHT
                                        989  1 *                              (NUR FUER AUDIT UNTERSTUETZT)
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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                          000001          990  1 ASASEIXV EQU   X'01'        EDT: INDEX IST GUELTIG

   00001F 00                              991  1 ASASEDF  DC    X'00'        EDT: LINKNAME EINES DUMPFILES
   000020 00                              992  1 ASASELL  DC    X'00'        EDT: ZEILENLAENGE. ES WERDEN NUR 80/132
                                          993  1 *                             ZEICHEN PRO ZEILE UNTERSTUETZT.
   000022 0000                            994  1 ASASEITN DC    H'0'         EDT: ITN DES ANZUSPRECHENDEN TASKS.
                                          995  1 *                             X'0000' BEDEUTET DEN DEFAULT-TASK
   000024 00000000                        996  1 ASASETSN DC    A(0)         EDT: TSN DES ANZUSPRECHENDEN TASKS
                                          997  1 *                             A(0) BEDEUTET DEN DEFAULT-TASK
   000028 00000000                        998  1 ASASEBUF DC    A(0)         EDT: A(PUFFER). MUSS IN KLASSE5/6 LIEGEN
   00002C 00000000                        999  1 ASASEBLN DC    A(0)         EDT: LAENGE DES PUFFERS.
   000030 00000000                       1000  1           DC    4A(0)            NICHT VERWENDET

                                         1001  1 ********************************************************************************
                                         1002  1 **                RUECKKEHR - PARAMETER                                   **
                                         1003  1 ********************************************************************************
                          000013         1004  1 ASASERTN EQU   ASARETRN
                          000000         1005  1 ASASEOK  EQU   X'00'        ALL: ALLES OK, ABER SIEHE 'ASASERFB'
                          000004         1006  1 ASASEFE  EQU   X'04'        ALL: FORMALER FEHLER
                                         1007  1 *                                - KEINE ZEILENLAENGE ANGEGEBEN
                                         1008  1 *                                - UNBEKANNTE SUBFUNKTIONSNUMMER
                                         1009  1 *                                - KEINE PUFFERLAENGE ANGEGEBEN
                                         1010  1 *                                - KEIN PUFFER ANGEGEBEN
                                         1011  1 *                                - KEIN KEY ANGEGEBEN
                                         1012  1 *                                - FEHLERHAFTE LINK#
                                         1013  1 *                                - PUFFER IST SO KLEIN, DASS KEIN
                                         1014  1 *                                  EINZIGER SATZ AUSGEGEBEN WIRD
                          000008         1015  1 ASASEKNF EQU   X'08'        ALL: UNBEKANNTES SCHLUESSELWORT/INTERNER
                                         1016  1 *                                SCHLUESSEL
                          00000C         1017  1 ASASENIA EQU   X'0C'        EDT: UNERLAUBTER INDEX ANGEGEBEN
                          000010         1018  1 ASASEBNA EQU   X'10'        EDT: PUFFER NICHT IN VOLLER LAENGE
                                         1019  1 *                                SCHREIBZUGREIFBAR, ODER NICHT IN
                                         1020  1 *                                KLASSE-5/6-SPEICHER
                          000014         1021  1 ASASEFOL EQU   X'14'        EDT: FOLGEAUFRUF ANGEGEBEN OHNE VORAN-
                                         1022  1 *                                GEGANGENEN ORIGINALAUFRUF
                          000018         1023  1 ASASEKNA EQU   X'18'        EDT: TABELLE EXISTIERT NICHT IM ANGEGEBENEN
                                         1024  1 *                                ADRESSRAUM ODER WURDE NICHT GESAVED
                                         1025  1 *                                REALER SLED: AUF TABELLE KONNTE NICHT
                                         1026  1 *                                             ZUGEGRIFFEN WERDEN.
                                         1027  1 *                                             (SEITE NICHT IM DF)
                          00001C         1028  1 ASASEDFN EQU   X'1C'        EDT: DUMPFILE NICHT OFFEN
                          000020         1029  1 ASASETNF EQU   X'20'        EDT: ITN/TSN EXISTIERT NICHT
                          000024         1030  1 ASASENOT EQU   X'24'        EDT: KEIN TASK SPEZIFIZIERT (NUR FUER
                                         1031  1 *                                DUMPFILEZUGRIFFE)
                          000028         1032  1 ASASEMEM EQU   X'28'        EDT: FUNKTION WEGEN SPEICHERMANGEL NICHT
                                         1033  1 *                                AUSFUEHRBAR.
                          00002C         1034  1 ASASEPV1 EQU   X'2C'        EDT: PRIVILEGIERUNG ZU KLEIN, KANN ABER
                                         1035  1 *                                NOCH AUSREICHEND ERHOEHT WERDEN.
                          000030         1036  1 ASASEPV2 EQU   X'30'        EDT: PRIVILEGIERUNG ZU KLEIN, KANN NICHT
                                         1037  1 *                                MEHR AUSREICHEND ERHOEHT WERDEN.
                          000034         1038  1 ASASERPT EQU   X'34'             NICHT MEHR VERWENDET
                          000038         1039  1 ASASENYI EQU   X'38'        EDT: FUNKTION NOCH NICHT IMPLEMENTIERT
                          00003C         1040  1 ASASENAL EQU   X'3C'        EDT: WEGEN SPEICHERMANGEL NUR TEIL DER
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```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1041  1 *                                    AUDIT-TABELLE GELIEFERT
                          000040        1042  1 ASASELOP EQU   X'40'          EDT: PCB-SCHLEIFE ENTDECKT. PUFFER
                                        1043  1 *                                    WURDE MIT INFORMATION GEFUELLT,
                                        1044  1 *                                    ABER ES IST KEIN FORTSETZUNGSAUFRUF
                                        1045  1 *                                    MEHR MOEGLICH
                          000044        1046  1 ASASESER EQU   X'44'          EDT: TABELLE WEGEN FALSCHER POINTER NICHT
                                        1047  1 *                                    AUSGEBBAR (SYSTEMFEHLER)
                          000048        1048  1 ASASENP  EQU   X'48'          EDT: NUR FUER PCB-ZUGRIFFE. DIE GELIEFERTE
                                        1049  1 *                                    INFORMATION IST VERMUTLICH KEIN PCB
                          00004C        1050  1 ASASETEY EQU   X'4C'          EDT: TABELLE LEER. EVENTUELLEN INHALT
                                        1051  1 *                                    IM AUSGABEBUFFER IGNORIEREN

000040                                  1052  1 ASASEXXX DS    0C
000040 00                               1053  1 ASASERFB DC    X'00'          ALL: INDIKATOR
                          000080        1054  1 ASASEIND EQU   X'80'          INF: SCHLUESSELWORT KANN INDEX HABEN
                          000040        1055  1 ASASERSU EQU   X'40'          INF: TRENNUNG NACH USER/SYSTEM MOEGLICH
                          000020        1056  1 ASASEBF  EQU   X'20'          EDT: PUFFER IST VOLL; WEITERER AUFRUF MIT
                                        1057  1 *                                    CONTINUE-ANZEIGE IST NOETIG
                          000004        1058  1 ASASEQUL EQU   ASAUQUAL       ALL: UEBERQUALIFIZIERTE EINGABE

000041 00                               1059  1 ASASERX  DC    X'00'          INF: MAXIMALWERT DES INDEX
                          000002        1060  1 ASASELEN EQU   *-ASASEXXX           LAENGE DER RUECKKEHR-PARAMETER
                          000042        1061  1 ASASEGLN EQU   *-ASASERVE           GESAMTLAENGE (EIN/AUSGABE-PARAMS)



                                        1062  1 ********************************************************************************
                                        1063  1 **                                                                            **
                                        1064  1 ** H A R D W A R E - I N F O R M A T I O N  FUER  A N W E N D E R  **
                                        1065  1 ** ------------------------------------------------------------ **
                                        1066  1 **  DER AUFRUFER KANN SICH MIT DIESEM SERVICE AUSGEWAEHLTE SPEICHER-**
                                        1067  1 **  BEREICHE AUS SLEDFILES IN EINEN VON IHM BEREITGESTELLTEN PUFFER **
                                        1068  1 **  AUSGEBEN LASSEN:                                                      **
                                        1069  1 **              - SCRATCHPAD (BZW. PSM)                                   **
                                        1070  1 **              - SPECIAL REGISTER SECTION (NUR BEI X-ANLAGEN)            **
                                        1071  1 **              - CPU-/IOP-LOGOUT-AREAS                                   **
                                        1072  1 **              - HARDWARE-TRACE                                          **
                                        1073  1 **              - AUDIT-ADRESS-REGISTER                                   **
                                        1074  1 **                                                                        **
                                        1075  1 **  BEMERKUNG: DIE AUDIT ADRESS REGISTER WERDEN NICHT - WIE ALLE    **
                                        1076  1 **  ANDEREN SPEICHERBEREICHE - IN EINEN VOM AUFRUFER BEREITGESTELL- **
                                        1077  1 **  TEN PUFFER UEBERTRAGEN, SONDERN DIREKT IN DIE ASERP-RETURNPA-   **
                                        1078  1 **  RAMETER GESCHRIESEN.                                              **
                                        1079  1 **                                                                        **
                                        1080  1 **  DIESER SERVICE IST UEBER TAM AUFRUFBAR.                            **
                                        1081  1 **  ER SOLL IN ZUKUNFT DEN SERVICE HARDWARE-INFORMATION (FUNKTION   **
                                        1082  1 **  X'30') WEITGEHEND ERSETZEN, DA ER DESSEN FUNKTIONEN VOLL MIT    **
                                        1083  1 **  ABDECKT.                                                          **
                                        1084  1 **                                                                        **
                                        1085  1 **  HINWEIS:     ES WERDEN STETS NUR ZUSAMMENHAENGENDE STUECKE AUS  **
                                        1086  1 **               DEN SPEICHERBEREICHEN IN DEN VOM ANWENDER BEREIT-   **
                                        1087  1 **               GESTELLTEN ( AUF WORTGRENZE AUSGERICHTETEN) PUFFER **
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1088  1 **              UEBERTRAGEN. VERSCHIEDENE SPEICHERBEREICHE KOENNEN **
                                        1089  1 **              NUR MIT MEHREREN SERVICE-AUFRUFEN UEBERTRAGEN WER- **
                                        1090  1 **              DEN.                                               **
                                        1091  1 ***************************************************************************
                          000014        1092  1          ORG   ASALABEL

                                        1093  1 ***************************************************************************
                                        1094  1 **            HEADER-PARAMETER                                     **
                                        1095  1 ***************************************************************************
                          000010        1096  1 ASAHI     EQU   X'10'             FUNKTION= HARDWARE-INFORMATION
                                        1097  1 *                                 FUER DEN ANWENDER
                          000000        1098  1 ASAHISP   EQU   X'00'             SUBFUNKTION: AUSGABE SCRATCHPAD
                          000004        1099  1 ASAHILA   EQU   X'04'             SUBFUNKTION: AUSGABE LOGOUT-AREA
                          000008        1100  1 ASAHISPR  EQU   X'08'             SUBFUNKTION: AUSGABE SPECIAL REGISTER
                                        1101  1 *                                 SECTION
                          00000C        1102  1 ASAHIAAR  EQU   X'0C'             SUBFUNKTION: AUSGABE ALLER AUDIT ADRESS
                                        1103  1 *                                 REGISTER IN AUSGABEPARAMETER(!)
                          000010        1104  1 ASAHIHWT  EQU   X'10'             SUBFUNKTION: AUSGABE HARDWARE-TRACE
                                        1105  1 *                                 (NOCH NICHT UNTERSTUETZT)
                          000010        1106  1 ASAHIMAX  EQU   X'10'             HOECHSTE SUBFUNKTIONSNUMMER

                                        1107  1 ***************************************************************************
                                        1108  1 **            AUFRUF-PARAMETER                                     **
                                        1109  1 ***************************************************************************
000014 00                               1110  1 ASAHILNK  DC    X'00'       ALL: SLEDFILE-LINKNUMMER
000015 00                               1111  1 ASAHIPRC  DC    X'00'       LA:  TYP DES PROZESSORS (CPU ODER IOP),
                                        1112  1 *                                DESSEN LOGOUT UEBERTRAGEN WERDEN SOLL
                          000080        1113  1 ASAHICPU  EQU   X'80'             PROZESSOR IST CPU
                          000040        1114  1 ASAHIIOP  EQU   X'40'             PROZESSOR IST IOP
000016 00                               1115  1 ASAHIPR#  DC    X'00'   BUT AAR: NUMMER DES PROZESSORS, DESSEN SPEICHER-
                                        1116  1 *                                BEREICHE UEBERTRAGEN WERDEN SOLLEN
                                        1117  1 *                              ! IST DIE PROZ# NICHT ANGEGEBEN, WIRD
                                        1118  1 *                                STANDARDMAESSIG PROZ#=0 ANGENOMMEN
000018 00000000                         1119  1 ASAHIBFA  DC    A(0)    BUT AAR: A(UEBERGEBENEM PUFFER); PUFFER MUSS
                                        1120  1 *                                AUF WORTGRENZE AUSGERICHTET SEIN.
00001C 0000                             1121  1 ASAHIBFL  DC    Y(0)    BUT AAR: LAENGE DES UEBERGEBENEN PUFFERS
00001E 0000                             1122  1 ASAHIRIA  DC    Y(0)    BUT AAR: REL. ANFANGSADR.( BZGL. TABEL-
                                        1123  1 *                                LENANFANG) DER GEW. INFORMATION
                                        1124  1 *                              ! DEFAULTWERT: 0
000020 0000                             1125  1 ASAHIIL   DC    Y(0)    BUT AAR: GEWUENSCHTE UEBERTRAGUNGSLAENGE
                                        1126  1 *                              ! STANDARDWERT: PUFFERLAENGE, MAXIMAL
                                        1127  1 *                                DIE TABELLENLAENGE

                                        1128  1 ***************************************************************************
                                        1129  1 **            RUECKKEHR-PARAMETER                                  **
                                        1130  1 ***************************************************************************
                          000013        1131  1 ASAHIRTN  EQU   ASARETRN    ALL: RETURNCODE
                          000000        1132  1 ASAHIAOK  EQU   X'00'       ALL: ALLES O.K.
                          000004        1133  1 ASAHIAFE  EQU   X'04'       ALL: FORMALER FEHLER:
                                        1134  1 *                                - UNGUELTIGE SUBFUNKTION
                                        1135  1 *                                - UNGUELTIGE LINK#
                                        1136  1 *                                - PUFFERADRESSE 0 ODER NICHT GESETZT
                                        1137  1 *                                - PUFFER NICHT ALLOKIERT
                                        1138  1 *                                  ODER PUFFER IM SYSTEMRAUM
                                        1139  1 *                                - PUFFER FUER INFO ZU KURZ
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1140  1 *                                - UNGUELTIGE PROZESSOR#
                                        1141  1 *                                - REL. ANFANGSADR. VON INFO
                                        1142  1 *                                  GROESSER ALS TABELLENLAENGE
                                        1143  1 *                                - UNGUELTIGER PROZESSORTYP
                  000008                1144  1 ASAHINYT EQU   X'08'        HWT: SUBFUNKTION NOCH NICHT UNTERSTUETZT
                  00000C                1145  1 ASAHINOI EQU   X'0C'        ALL: INFORMATION KONNTE NICHT UEBERTRAGEN
                                        1146  1 *                WERDEN ODER IST IN VORLIEGENDEM SLED NICHT VORHANDEN
                  000010                1147  1 ASAHILIL EQU   X'10'        ALL: INFORMATION WIRD HOECHSTENS
                                        1148  1 *                                IN TABELLENLAENGE UEBERTRAGEN
                  000014                1149  1 ASAHIFNO EQU   X'14'        ALL: DUMPFILE NICHT OFFEN
                  000018                1150  1 ASAHINOS EQU   X'18'        ALL: KEIN SLEDFILE
000024                                  1151  1 ASAHIXXX DS    0F
000024 00000000                         1152  1 ASAHIAA0 DC    A(0)         AAR: AUDIT ADRESS REGISTER (CPU-0)
000028 00000000                         1153  1 ASAHIAA1 DC    A(0)         AAR:   "      "      "     (CPU-1)
00002C 00000000                         1154  1 ASAHIAA2 DC    A(0)         AAR:   "      "      "     (CPU-2)
000030 00000000                         1155  1 ASAHIAA3 DC    A(0)         AAR:   "      "      "     (CPU-3)
000034 0000                             1156  1 ASAHIMVL DC    Y(0)     BUT AAR: ANZAHL DER UEBERTRAGENEN BYTES
                  000012                1157  1 ASAHILEN EQU   *-ASAHIXXX        LAENGE DER RETURNPARAMETER



                                        1158  1 ********************************************************************************
                                        1159  1 **                                                                            **
                                        1160  1 **                    O P E N   D U M P F I L E                               **
                                        1161  1 **                    -------------------------                               **
                                        1162  1 **  DIESER SERVICE MUSS VOR DEM ERSTEM DUMPDATEI-ZUGRIFF ERFOLGEN.            **
                                        1163  1 **  DAMIT KANN SICH DER AUFRUFER EINE DUMPDATEI FUER ZUKUENFTIGE             **
                                        1164  1 **  ZUGRIFFE ANMELDEN UND ERGEFFNEN. EIN UND DIESELBE DATEI KANN            **
                                        1165  1 **  UNTER VERSCHIEDENEN KURZNAMEN MEHRMALS ERGEFFNET WERDEN. DER            **
                                        1166  1 **  GLEICHE KURZNAME IST IMMER NUR FUER GENAU EINE OFFENE DATEI             **
                                        1167  1 **  VERWENDBAR.                                                             **
                                        1168  1 **                                                                            **
                                        1169  1 ********************************************************************************
                  000014                1170  1          ORG   ASALABEL

                                        1171  1 ********************************************************************************
                                        1172  1 **                HEADER - PARAMETER                                          **
                                        1173  1 ********************************************************************************
                  000018                1174  1 ASAOT    EQU   X'18'                OPEN DUMP-FILE
                                        1175  1 *                                ES GIBT KEINE SUBFUNKTION.
                  000000                1176  1 ASAOTMAX EQU   X'00'             MAX. # OF SUBFUNCTION

                                        1177  1 ********************************************************************************
                                        1178  1 **                AUFRUF - PARAMETER                                          **
                                        1179  1 ********************************************************************************
000014 4040404040404040                 1180  1 ASAOTFIL DC    CL54' '           DUMP FILE NAME
00004A 00                               1181  1 ASAOTLN# DC   X'00'              LINK # OF SPECIFIED DUMPFILE

                                        1182  1 ********************************************************************************
                                        1183  1 **                RUECKKEHR - PARAMETER                                       **
                                        1184  1 ********************************************************************************
                  000013                1185  1 ASAOTRTN EQU   ASARETRN          RETURN CODE
                  000000                1186  1 ASAOTOK  EQU   X'00'             DUMPFILE OPENED
                  000004                1187  1 ASAOTFMD EQU   X'04'             FORMAL ERROR
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1188  1 *                                - INVALID LINK#
                                        1189  1 *                                - INVALID SUBFUNCTION
                          000008        1190  1 ASAOTNE  EQU   X'08'             FILE COULD NOT BE OPENED
                          00000C        1191  1 ASAOTNDT EQU   X'0C'             FILE IS NO DUMPED TASK
                          000010        1192  1 ASAOTNOM EQU   X'10'             NO MEMORY FOR DUMPFILEAREA
                          000014        1193  1 ASAOTIVB EQU   X'14'             FILE DOESN'T CONTAIN VALID
                                        1194  1 *                                INDEX000-BLOCK; NOT PROCESSABLE
                          000018        1195  1 ASAOTFAO EQU   X'18'             FILE WITH SPECIFIED LINK # IS ...
                                        1196  1 *                                .. ALREADY OPEN
                          00001C        1197  1 ASAOTBSV EQU   X'1C'             BS2000-VERSION OF DUMPFILE UNKNOWN
                                        1198  1 *                                OR NOT SUPPORTED (SEE OTVER)
                          000020        1199  1 ASAOTTPE EQU   X'20'             ACCESS TO TAPE-FILES NOT SUPPORTED
00004B                                  1200  1 ASAOTXXX DS    0X
00004B E8F7F0                           1201  1 ASAOTVER DC    CL3'Y70'          BS2000-VERSION OF DUMPFILE
00004E 00                               1202  1 ASAOT#T  DC    X'00'             # OF TITLE-LINES (132 BYTES EACH)
00004F 00                               1203  1 ASAOTTYP DC    X'00'             DUMPFILE-TYP
                          000008        1204  1 ASAOTSLD EQU   X'08'             SLED-FILE
                          000004        1205  1 ASAOTCUS EQU   X'04'             CDUMP-USER-FILE
                          000002        1206  1 ASAOTCSY EQU   X'02'             CDUMP-SYSTEM-FILE
000050 0000                             1207  1 ASAOT#TK DC    H'00'             # OF TASKS IN FILE
000054 00000000                         1208  1 ASAOTTIT DC    A(0)              POINTER TO TITLE-LINES
000058 00000000                         1209  1 ASAOTBAS DC    A(0)              VIRTUAL LOAD-ADDRESS OF SYSTEM
00005C 00000000                         1210  1 ASAOTXVT DC    A(0)              A(XVT)
000060 00000000                         1211  1 ASAOTMEM DC    A(0)              SIZE OF MAIN-MEMORY
000064 0000                             1212  1 ASAOTERR DC    H'0'              DMS-ERRORCODE, FALLS RTN = 'OTNE'
                                        1213  1 *********       DIE FOLGENDE INFORMATION WIRD NUR DANN UEBERGEBEN,
                                        1214  1 *********       WENN DER AUFRUFER AIDSYS NICHT MIT EINER 'TAM'-
                                        1215  1 *********       VERSION AELTER ALS X'0B' GERUFEN HAT.
                          00001B        1216  1 ASAOTSLN EQU   *-ASAOTXXX        LAENGE DER KURZEN PARAMETERLISTE
000066                                  1217  1 ASAOTXSL DS    Y(0)              LAENGE SCRATCHPAD
000068                                  1218  1 ASAOTSRL DS    Y(0)              LAENGE SPECREGS
00006A                                  1219  1 ASAOTCPL DS    Y(0)              LAENGE CPU-LOGOUT-AREA
00006C                                  1220  1 ASAOTIPL DS    Y(0)              LAENGE IOP-LOGOUT-AREA
00006E                                  1221  1 ASAOTCBM DS    X'00'             BITMAP FUER CPU'S
00006F                                  1222  1 ASAOTIBM DS    X'00'             BITMAP FUER IOP'S
                          000025        1223  1 ASAOTLEN EQU   *-ASAOTXXX        LENGTH(RET.PARAMS)



                                        1224  1 ********************************************************************************
                                        1225  1 **                                                                            **
                                        1226  1 **                  R E Q U E S T    S T O R A G E                         **
                                        1227  1 **                  ----------------------------                          **
                                        1228  1 **  DIESER SERVICE DIENT ZUM ANFORDERN VON KLASSE- 5 - SPEICHER.             **
                                        1229  1 **  EIN P1-AUFRUFER ERHAELT AUTOMATISCH NICHT-PRIVILEGIERTEN, EIN           **
                                        1230  1 **  P2-AUFRUFER PRIVILEGIERTEN SPEICHER. IN JEDEM FALL ERFOLGT NUR          **
                                        1231  1 **  EINE GANZWORT - AUSRICHTUNG DES GELIEFERTEN BEREICHS.                   **
                                        1232  1 **                                                                            **
                                        1233  1 ********************************************************************************
                          000014        1234  1           ORG   ASALABEL



                                        1235  1 ********************************************************************************
                                        1236  1 **              HEADER - PARAMETER                                            **
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1237  1 ********************************************************************************
                          00001C        1238  1 ASARQ     EQU   X'1C'          ALL: FUNCTION = REQUEST MEMORY
                          000000        1239  1 ASARQD    EQU   X'00'          D:   SUBFUNCTION = DYNAMIC STORAGE
                          000004        1240  1 ASARQS    EQU   X'04'          S:   SUBFUNCTION = STATIC STORAGE
                          000004        1241  1 ASARQMAX  EQU   X'04'               MAX. # OF SUBFUNCTION

                                        1242  1 ********************************************************************************
                                        1243  1 **              AUFRUF - PARAMETER                                            **
                                        1244  1 ********************************************************************************
000014 0000                             1245  1 ASARQNB   DC    H'0'           ALL: # OF REQUESTED BYTES

                                        1246  1 ********************************************************************************
                                        1247  1 **              RUECKKEHR - PARAMETER                                         **
                                        1248  1 ********************************************************************************
                          000013        1249  1 ASARQRTN  EQU   ASARETRN       ALL: RETURN CODE
                          000000        1250  1 ASARQOK   EQU   X'00'          ALL: REQUEST HONORED, ADDR IN RQADR
                          000004        1251  1 ASARQFE   EQU   X'04'          ALL: FORMALER FEHLER
                                        1252  1 *                                    - UNGUELTIGE SUBFUNKTION
                                        1253  1 *                                    - AUFRUFER IST NICHT AID
                          000008        1254  1 ASARQNO   EQU   X'08'          ALL: NO STORAGE AVAIABLE

000018                                  1255  1 ASARQXXX  DS    0F
000018 00000000                         1256  1 ASARQADR  DC    A(0)           ALL: ADDRESS OF RETURNED AREA
                          00001C        1257  1 ASARQLGH  EQU   *-ASASERVE           LEN(RQ PARAMS)
                          000004        1258  1 ASARQLEN  EQU   *-ASARQXXX           LEN(RET.PARAMS)



                                        1259  1 ********************************************************************************
                                        1260  1 **                                                                            **
                                        1261  1 **               R E L E A S E    M E M O R Y                                 **
                                        1262  1 **               ---------------------------                                  **
                                        1263  1 **  DIESER SERVICE DIENT ZUM FREIGEBEN VON SPEICHER, DER VORHER               **
                                        1264  1 **  MIT DEM 'REQUEST MEMORY' - SERVICE ANGEFORDERT WURDE.                     **
                                        1265  1 **                                                                            **
                                        1266  1 ********************************************************************************
                          000014        1267  1          ORG   ASALABEL

                                        1268  1 ********************************************************************************
                                        1269  1 **              HEADER - PARAMETER                                            **
                                        1270  1 ********************************************************************************
                          000020        1271  1 ASARL     EQU   X'20'               FUNCTION = RELEASE MEMORY
                                        1272  1 *                                     ES GIBT KEINE SUBFUNKTIONEN
                          000000        1273  1 ASARLMAX  EQU   X'00'               MAX. # OF SUBFUNCTION

                                        1274  1 ********************************************************************************
                                        1275  1 **              AUFRUF - PARAMETER                                            **
                                        1276  1 ********************************************************************************
000014 00000000                         1277  1 ASARLADR  DC    A(0)              ADDR OF AREA TO RELEASE
                                        1278  1 *                                     RLADR MUST BE A RQADR, OF AN
                                        1279  1 *                                     EARLIER REQUEST
000018 00                               1280  1 ASARLFB   DC    X'00'             INDICATOR
                          000080        1281  1 ASARLSGL  EQU   X'80'               RELEASE ONLY SPECIFIED (BY ADDRESS)
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1282  1 *                                  PARTIAL PAGE. IF INDICATOR IS RESET,
                                        1283  1 *                                  THEN ALL PARTIAL PAGES THAT HAVE
                                        1284  1 *                                  BEEN REQUESTED AFTER THE REQUEST OF
                                        1285  1 *                                  THE SPECIFIED PAGE WILL ALSO BE
                                        1286  1 *                                  RELEASED.


                                        1287  1 ************************************************************************
                                        1288  1 **                RUECKKEHR - PARAMETER                             **
                                        1289  1 ************************************************************************
000013                                  1290  1 ASARLRTN EQU   ASARETRN            RETURN CODE
000000                                  1291  1 ASARLOK  EQU   X'00'               AREA COULD BE RELEASED
000004                                  1292  1 ASARLFE  EQU   X'04'               FORMALER FEHLER
                                        1293  1 *                                  - AUFRUFER IST NICHT 'AID'
                                        1294  1 *                                  - UNGUELTIGE SUBFUNKTION
000008                                  1295  1 ASARLLE  EQU   X'08'               THERE IS NO REQUEST WITH RLADR
                                        1296  1 *
                                        1297  1 *    NOTE 1: THE IMPLICIT RELEASE OF ALL KINDS OF STORAGE IS DESCRIBED
                                        1298  1 *            IN 'BENUTZERSCHNITTSTELLE FUER AIDSYS'.
                                        1299  1 *    NOTE 2: DYNAMIC STORAGE CAN BE RELEASED ONLY FOR THE ACTUAL
                                        1300  1 *            TESTLEVEL.
000006                                  1301  1 ASARLLEN EQU   *-ASARLRTN          LENGTH(RET.PARAMS)



                                        1302  1 ************************************************************************
                                        1303  1 **                                                                    **
                                        1304  1 **                    C A L L   S Y S T E M                           **
                                        1305  1 **                    ---------------------                           **
                                        1306  1 **  DIESER SERVICE DIENT ZUR RUECKKEHR ZUM SYSTEM, UM:                **
                                        1307  1 **  - EIN KOMMANDO ZU LESEN,                                          **
                                        1308  1 **  - EIN SYSTEMKOMMANDO AUSFUEHREN ZU LASSEN,                        **
                                        1309  1 **  - DAS PROGRAMM ZU STARTEN.                                        **
                                        1310  1 **  DIE RUECKKEHR ZU 'AID' NACH AUSFUEHRUNG EINER FUNKTION KANN       **
                                        1311  1 **  SOFORT (KDO LESEN), VERZOEGERT (PROGRAMM-START) ODER GAR NICHT    **
                                        1312  1 **  ERFOLGEN (MANCHE SYSTEM-KDOS).                                    **
                                        1313  1 **  DER ERSTE AUFRUF VON 'AID' BZGL. EINER STACK-EBENE ERFOLGT         **
                                        1314  1 **  UEBER EINE PSEUDO-RUECKKEHR DIESES SERVICE.                       **
                                        1315  1 **                                                                    **
                                        1316  1 ************************************************************************
000014                                  1317  1          ORG   ASALABEL

                                        1318  1 ************************************************************************
                                        1319  1 **              HEADER - PARAMETER                                    **
                                        1320  1 ************************************************************************
000024                                  1321  1 ASACS    EQU   X'24'          ALL: FUNCTION = CALL SYSTEM
000000                                  1322  1 ASACSRC  EQU   X'00'          RC:  SUBFUNCTION = READ NEXT COMMAND
000004                                  1323  1 ASACSESC EQU   X'04'          ESC: SUBFUNCTION = EXEC SYSTEM CMD
000008                                  1324  1 ASACSRSM EQU   X'08'          RSM: SUBFUNCTION = RESUME
000008                                  1325  1 ASACSMAX EQU   X'08'               MAXIMUM SUBFUNCTION #

                                        1326  1 ************************************************************************
                                        1327  1 **              AUFRUF - PARAMETER                                    **
                                        1328  1 ************************************************************************
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000014 00000000                     1329  1 ASACSADR DC    A(0)          ESC: ADDR OF V-FORMATED CMD
                                        1330  1 *                                MUST BEGIN WITH 1ST 4 BYTES UNUSED
                                        1331  1 *                                (FOLLOWED BY 4 BYTES V-FORMAT AND
                                        1332  1 *                                CMD-STRING.) LENGTH GIVEN IN V-FORMAT
                                        1333  1 *                                IS WITHOUT 1ST 4 BYTES
                       000014           1334  1          ORG   ASACSADR
    000014 00                           1335  1 ASACSFB  DC    X'00'         RC:  ANZEIGENBYTE
                       000080           1336  1 ASACSSPO EQU   X'80'         RC:  JOB STEP TERMINATION DURCHFUEHREN
                       000018           1337  1          ORG   ASACSADR+4


                                        1338  1 ********************************************************************
                                        1339  1 **              RUECKKEHR - PARAMETER                             **
                                        1340  1 ********************************************************************
                       000013           1341  1 ASACSRTN EQU   ASARETRN      ALL: RETURN CODE
                       000000           1342  1 ASACSCMD EQU   X'00'         ALL: FIRST CHECK, WHETHER ASACSTRM IS
                                        1343  1 *                                SET. IF YES, THEN PSEUDO-RETURN
                                        1344  1 *                                FOR TERMINATION-PROCESSING AND
                                        1345  1 *                                NOTHING ELSE. OTHERWISE REGULAR
                                        1346  1 *                                RETURN FROM CALL WITH SUBFUNCTION.
                       000004           1347  1 ASACSFE  EQU   X'04'         ALL: FORMALER FEHLER:
                                        1348  1 *                                - AUFRUFER IST NICHT 'AID'
                                        1349  1 *                                - UNGUELTIGE SUBFUNKTION
                                        1350  1 *                                - ESC: KOMMANDO-PUFFER IST NICHT
                                        1351  1 *                                  ALLOKIERT
                                        1352  1 *                                - ESC: KOMMANDO-STRING IST NICHT
                                        1353  1 *                                  WORT-AUSGERICHTET
                       000008           1354  1 ASACSINT EQU   X'08'         RC:  INTERRUPT FOR AID, INT-KEY IN 'CSIKY'
                       00000C           1355  1 ASACSEVT EQU   X'0C'         RC:  EVENT FOR AID, EVENT-KEY IN 'CSEKY'
                       000010           1356  1 ASACSPV  EQU   X'10'         RC:  PROGRAM GOT LOADED WITH LSD
                       000014           1357  1 ASACSLNK EQU   X'14'         RC:  MODULE GOT LINKED

    000018                              1358  1 ASACSXXX DS    0X
    000018 00                           1359  1 ASACSINI DC    X'00'         RC:  INDICATOR
                       000080           1360  1 ASACSSIN EQU   X'80'         RC:  INIT. OF STATIC DATA
                       000040           1361  1 ASACSDIN EQU   X'40'         RC:  INIT. OF DYN. DATA
                       000020           1362  1 ASACSRUN EQU   X'20'         RC:  MONITORED PROGRAM DID RUN SINCE
                                        1363  1 *                                LAST TIME'S CALL OF AID
                       000010           1364  1 ASACSTRM EQU   X'10'         RC:  TERMINATION-PROCESSING
                       000008           1365  1 ASACSEX  EQU   X'08'         ESC: SYSTEM-KOMMANDO WURDE NICHT AUSGEFUEHRT
                       000004           1366  1 ASACSJST EQU   X'04'         ESC: JOB STEP TERMINATION GEFORDERT
                       000002           1367  1 ASACSNAL EQU   X'02'         ESC: DAS ANGEGEBENE SYSTEM-KOMMANDO
                                        1368  1 *                                IST NICHT FUER DIE BEARBEITUNG
                                        1369  1 *                                DURCH 'EMCLP' ERLAUBT

    000019 00                           1370  1 ASACSIKY DC    X'00'         RC:  INTERRUPT-KEY
                       000080           1371  1 ASACSTPI EQU   X'80'         RC:  TESTPOINT INTERRUPT
                       00007C           1372  1 ASACSTMI EQU   X'7C'         RC:  TEST MODE INTERRUPT
                       000084           1373  1 ASACSSXT EQU   X'84'         RC:  SIXIT IN USER PROGRAM
                       000088           1374  1 ASACSS97 EQU   X'88'         RC:  SVC 97 (TO AID ?)
                       000050           1375  1 ASACSSVC EQU   X'50'         RC:  SVC HAS TAKEN PLACE
                       000060           1376  1 ASACSM60 EQU   X'60'         RC:  DATA ERROR
                       000064           1377  1 ASACSM64 EQU   X'64'         RC:  EXPONENT OVERFLOW
                       000068           1378  1 ASACSM68 EQU   X'68'         RC:  DIVIDE ERROR
                       00006C           1379  1 ASACSM6C EQU   X'6C'         RC:  SIGNIFICANCE ERROR
```

```
FLAG LOCTN OBJECT CODE     ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                           000070         1380  1 ASACSW70 EQU   X'70'        RC:  EXPONENT UNDERFLOW
                           000074         1381  1 ASACSW74 EQU   X'74'        RC:  DECIMAL OVERFLOW
                           000078         1382  1 ASACSW78 EQU   X'78'        RC:  FIXED-POINT OVERFLOW
                           000006         1383  1 ASACSW6  EQU   X'06'        RC:  2. STXIT (STXIT IN STXIT)
                           000044         1384  1 ASACSW44 EQU   X'44'        RC:  EXIT, AND NO STXIT SVC BEFORE
                           00004C         1385  1 ASACSW4C EQU   X'4C'        RC:  EXIT, AND NO INTERRUPT BEFORE
                           000003         1386  1 ASACSW3  EQU   X'03'        RC:  ERROR IN SVC CALL
                           000004         1387  1 ASACSW4  EQU   X'04'        RC:  ILLEGAL SVC CALL
                           000005         1388  1 ASACSW5  EQU   X'05'        RC:  THERE IS NO STXIT ROUTINE
                           00000C         1389  1 ASACSW0C EQU   X'0C'        RC:  BYTE BOUNDARY
                           000048         1390  1 ASACSW48 EQU   X'48'        RC:  PAGING ERROR
                           000054         1391  1 ASACSW54 EQU   X'54'        RC:  PRIVILEGED OPERATION
                           000058         1392  1 ASACSW58 EQU   X'58'        RC:  ILLEGAL OPERATION CODE
                           00005C         1393  1 ASACSW5C EQU   X'5C'        RC:  ADDRESS ERROR
                           000000         1394  1 ASACSW0  EQU   X'00'        RC:  TERM SVC
                           000001         1395  1 ASACSW1  EQU   X'01'        RC:  TERMD SVC
                           000002         1396  1 ASACSW2  EQU   X'02'        RC:  TERMJ SVC
                           000007         1397  1 ASACSW7  EQU   X'07'        RC:  LPOV / LINK SVC
                           000019         1398  1 ASACSEKY EQU   ASACSIKY

00001A 00                                 1399  1 ASACSLLK DC    X'00'        RC:  SET ONLY, IF ASACSW7 IS SET
                                          1400  1 *                             =C'0': LPOV-SVC
                                          1401  1 *                             =C'L': LINK-SVC
00001B 00                                 1402  1 ASACSS#  DC    X'00'        RC:  SVC#, SET ONLY IF ASACSSVC IS SET
00001C 00000000                           1403  1 ASACSSAD DC    A(0)         RC:  A(STAT. AID-DATA); VALID ONLY IF
                                          1404  1 *                             CSSIN IS SET
000020 00000000                           1405  1 ASACSDAD DC    A(0)         RC:  A(DYN. AID-DATA); VALID ONLY IF
                                          1406  1 *                             CSDIN IS SET
000024 00000000                           1407  1 ASACSCVF DC    A(0)         RC:  CSCVF<0 : CSCVF POINTS TO V-FORMATED
                                          1408  1 *                             CMD IN SYSTEM
                                          1409  1 *                             CSCVF>=0: CSCVF POINTS TO V-FORMATED
                                          1410  1 *                             IN DYNAMIC STORAGE
                           000080         1411  1 ASACSCNC EQU   X'80'              ANZEIGE FUER 'KOMMANDO WURDE NICHT
                                          1412  1 *                             KOPIERT'
000028 000000000000                       1413  1 ASACSORG DC    XL6'00'      RC:  ORIGINAL CODE, IF CSIKY =CSTPI
000030 00000000                           1414  1 ASACSAM  DC    A(0)         RC:  PROGRAM RELATIVE ADDRESS OF MODULE
000034 00000000                           1415  1 ASACSAC  DC    A(0)         RC:  MODULE RELATIVE ADDRESS OF CSECT
000038 00000000                           1416  1 ASACSLOC DC    A(0)         RC:  A(ENTRY IN LOCALISIERUNGSLISTE)
00003C 00000000                           1417  1 ASACSGLB DC    A(0)         RC:  A(1ST A-BLOCK)
000040 4040404040404040                   1418  1 ASACSCS  DC    CL8' '       RC:  CSECT-NAME OF ACTUAL LOCATION
000048 4040404040404040                   1419  1 ASACSMOD DC    CL8' '       RC:  MODUL-NAME OF ACTUAL LOCATION
000050 4040404040404040                   1420  1 ASACSLPM DC    CL8' '       RC:  NAME OF MODULE THAT GOT LOADED BY
                           000050         1421  1          ORG   ASACSLPM
000050 E2E5C34040404040                   1422  1 ASACSVCN DC    CL8'SVC'     RC:  NAME OF SVC (SET ONLY, IF 'ASACSSVC'
                                          1423  1 *                             IS SET.
000058 00                                 1424  1 ASACSTTP DC    X'00'        RC:  TRACE-TYPE; VALID ONLY IF TRACE IS SET
000059 00                                 1425  1 ASACSCC  DC    X'00'        RC:  CONDITION-CODE; SET ONLY WHEN TRACE
00005C 00000000                           1426  1 ASACSAAL DC    4A(0)        RC:  A MAXIMUM OF 4 ADDRESSES OF ACTION-
                                          1427  1 *                             LISTS MAY BE SPECIFIED, IF ASACSRTN = ASACSINT
                                          1428  1 *                             OR = ASACSEVT.
                           000080         1429  1 ASACSTAL EQU   X'80'        RC:  IF SET (LEFTMOST BYTE OF ABOVE
                                          1430  1 *                             ADDRESS) THEN ACTION-LIST BELONGS TO TRACE-
                                          1431  1 *                             INTERRUPT
00006C 0000                               1432  1 ASACSCLN DC    H'0'         RC:  LENGTH OF CMD-STRING
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                          000056          1433  1 ASACSLEN EQU   *-ASACSXXX       LENGTH(RET.PARAMS)



                                          1434  1 ********************************************************************
                                          1435  1 **                                                                **
                                          1436  1 **                  C L O S E   D U M P F I L E                   **
                                          1437  1 **                  ---------------------------                   **
                                          1438  1 **  MIT DIESEM SERVICE KANN EIN VORHER MIT 'OPEN DUMPFILE' ANGE-   **
                                          1439  1 **  MELDETER DUMPFILE EXPLIZIT GESCHLOSSEN WERDEN.                 **
                                          1440  1 **                                                                **
                                          1441  1 ********************************************************************
                          000014          1442  1          ORG   ASALABEL

                                          1443  1 ********************************************************************
                                          1444  1 **              HEADER - PARAMETER                                **
                                          1445  1 ********************************************************************
                          000028          1446  1 ASACD    EQU   X'28'             FUNCTION = CLOSE DUMPFILE
                          000000          1447  1 ASACDSGL EQU   X'00'             SUBFUNCTION = CLOSE 1 SINGLE FILE
                          000004          1448  1 ASACDALL EQU   X'04'             SUBFUNCTION = CLOSE ALL FILES
                          000004          1449  1 ASACDMAX EQU   X'04'             MAXIMUM SUBFUNCTION #

                                          1450  1 ********************************************************************
                                          1451  1 **              AUFRUF - PARAMETER                                **
                                          1452  1 ********************************************************************
000014 00                                 1453  1 ASACDLN# DC    X'00'       SGL: LINK# OF DUMPFILE TO BE CLOSED

                                          1454  1 ********************************************************************
                                          1455  1 **              RUECKKEHR - PARAMETER                             **
                                          1456  1 ********************************************************************
                          000013          1457  1 ASACDRTN EQU   ASARETRN          RUECKKEHRCODE
                          000000          1458  1 ASACDOK  EQU   X'00'       ALL: DATEI WURDE GESCHLOSSEN
                          000004          1459  1 ASACDFE  EQU   X'04'       ALL: FORMALER FEHLER:
                                          1460  1 *                               - UNGUELTIGE SUBFUNKTION
                          000008          1461  1 ASACDNC  EQU   X'08'       ALL: DATEI KONNTE NICHT GESCHLOSSEN WERDEN
                          00000C          1462  1 ASACDIL  EQU   X'0C'       ALL: UNGUELTIGE LINKNUMMER
                          000010          1463  1 ASACDFNO EQU   X'10'       SGL: DATEI WAR NICHT OFFEN

000015
000015 4040404040404040                   1464  1 ASACDXXX DS    0X
                                          1465  1 ASACDFIL DC    CL54' '     SGL: NAME OF FILE
                          000036          1466  1 ASACDLEN EQU   *-ASACDXXX       LENGTH(RETURN PARAMS)



                                          1467  1 ********************************************************************
                                          1468  1 **                                                                **
                                          1469  1 **                  C L O S E   O U T P U T F I L E               **
                                          1470  1 **                  -------------------------------               **
                                          1471  1 **  DIESER SERVICE DIENT ZUM EXPLIZITEN SCHLIESSEN EINER AUSGABE-  **
                                          1472  1 **  DATEI.                                                        **
                                          1473  1 **                                                                **
                                          1474  1 ********************************************************************
                          000014          1475  1          ORG   ASALABEL
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1476  1 ********************************************************************************
                                        1477  1 **              HEADER - PARAMETER                                            **
                                        1478  1 ********************************************************************************
                  00002C                1479  1 ASACL    EQU   X'2C'        ALL: FCT =CLOSE OUTPUTFILE
                  000000                1480  1 ASACLOF  EQU   X'00'        OF:  SUBFUNCTION = CLOSE OUTPUT-FILE
                  000000                1481  1 ASACLMAX EQU   X'00'             MAXIMUM SUBFUNCTION #

                                        1482  1 ********************************************************************************
                                        1483  1 **              AUFRUF - PARAMETER                                            **
                                        1484  1 ********************************************************************************
000014 00                               1485  1 ASACLLN# DC    X'00'        ALL: LINKNUMMER DER AUSGABEDATEI


                                        1486  1 ********************************************************************************
                                        1487  1 **              RUECKKEHR - PARAMETER                                         **
                                        1488  1 ********************************************************************************
                  000013                1489  1 ASACLRTN EQU   ASARETRN     ALL: RETURN CODE
                  000000                1490  1 ASACLOK  EQU   X'00'        ALL: DATEI WURDE GESCHLOSSEN
                  000004                1491  1 ASACLFE  EQU   X'04'        ALL: FORMALER FEHLER:
                                        1492  1 *                                 - AUFRUFER IST NICHT 'AID'
                                        1493  1 *                                 - UNGUELTIGE SUBFUNKTION
                  000008                1494  1 ASACLILK EQU   X'08'        ALL: UNGUELTIGE LINKNUMMER
                  00000C                1495  1 ASACLCNC EQU   X'0C'        ALL: DATEI KONNTE NICHT GESCHLOSSEN WERDEN
                  000010                1496  1 ASACLOPN EQU   X'10'        ALL: DATEI WAR NICHT OFFEN

000015                                  1497  1 ASACLXXX DS    0X
000015 C6C9D3C540404040                 1498  1 ASACLFIL DC    CL54'FILE'   ALL: DATEINAME
                  000036                1499  1 ASACLLEN EQU   *-ASACLXXX         LENGTH(RETURN PARAMS)



                                        1500  1 ********************************************************************************
                                        1501  1 **                                                                            **
                                        1502  1 **                      S E T    S W I T C H                                 **
                                        1503  1 **                      -------------------                                   **
                                        1504  1 **  DURCH AUFRUF DIESER FUNKTION KOENNEN GLOBALE VOREINSTELLUNGEN          **
                                        1505  1 **  IN 'AIDSYS' GEAENDERT WERDEN.                                           **
                                        1506  1 **  - EIN/AUSGABE AUF HAUPTKONSOLE                                          **
                                        1507  1 **  - EIN/AUSGABE UEBER 'SYSOUT'                                            **
                                        1508  1 **  - 'AID' = OLD  (NOCH NICHT UNTERSTUETZT)                                **
                                        1509  1 ********************************************************************************
                  000014                1510  1          ORG   ASALABEL

                                        1511  1 ********************************************************************************
                                        1512  1 **              HEADER - PARAMETER                                            **
                                        1513  1 ********************************************************************************
                  000030                1514  1 ASACO    EQU   X'30'        ALL: FUNCTION = SET SWITCH
                  000000                1515  1 ASACOIN  EQU   X'00'        IN:  SUBFUNCTION =SWITCH TO CONSOLE-I/O
                  000004                1516  1 ASACOOUT EQU   X'04'        OUT: SUBFUNCTION =SWITCH TO SYSOUT
                  000008                1517  1 ASACOOLD EQU   X'08'        OLD: SUBFUNCTION =SWITCH TO AID=OLD
                                        1518  1 *                                 (NOT YET SUPPORTED)

                                        1519  1 ********************************************************************************
                                        1520  1 **              AUFRUF - PARAMETER                                            **
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                  1521  1 ********************************************************************************
                                  1522  1 *
                                  1523  1 *        ES GIBT KEINE AUFRUF-PARAMETER


                                  1524  1 ********************************************************************************
                                  1525  1 **              RUECKKEHR - PARAMETER                                         **
                                  1526  1 ********************************************************************************
                    000013        1527  1 ASACGRTN EQU   ASARETRN     ALL: RETURN CODE
                    000000        1528  1 ASACGOK  EQU   X'00'        ALL: REQUEST HONORED
                    000004        1529  1 ASACGFE  EQU   X'04'        ALL: FORMALER FEHLER:
                                  1530  1 *                                 - AUFRUFER IST NICHT 'AID'
                                  1531  1 *                                 - UNGUELTIGE SUBFUNKTION
                    000008        1532  1 ASACGPRV EQU   X'08'        IN:  CALLER IS NOT TSOS


                                  1533  1 ********************************************************************************
                                  1534  1 **                                                                            **
                                  1535  1 **        S A V E    S Y S T E M T A B L E S                                   **
                                  1536  1 **        -----------------------------------                               **
                                  1537  1 **                                                                            **
                                  1538  1 **        TCB, PCBS AND P2 AUDIT TABLES ARE SAVED FOR AN                      **
                                  1539  1 **        SPECIFIED TASK.                                                     **
                                  1540  1 **                                                                            **
                                  1541  1 ********************************************************************************
                    000014        1542  1           ORG   ASALABEL

                                  1543  1 ********************************************************************************
                                  1544  1 **        HEADER - INFORMATION                                                **
                                  1545  1 ********************************************************************************
                    000034        1546  1 ASASV     EQU   X'34'         ALL: FUNCTION = SAVE SYSTEMTABLES
                    000000        1547  1 ASASVSAV  EQU   X'00'         SAV: SUBFUNCT: SAVE SYSTABLES FOR SPEC.TASK
                    000004        1548  1 ASASVUSV  EQU   X'04'         USV: SUBFUNCT: UNSAVE SYSTABLES F.SPEC.TASK
                    000008        1549  1 ASASVUSA  EQU   X'08'         USA: SUBFUNCT: UNSAVE SYSTABLES F.ALL TASKS
                    000008        1550  1 ASASVMAX  EQU   X'08'              MAXIMUM SUBFUNCTION

                                  1551  1 ********************************************************************************
                                  1552  1 **        AUFRUF - PARAMETER                                                  **
                                  1553  1 ********************************************************************************

000014 00000000                   1554  1 ASASVTSN DC    F'0'          ALL: TSN
000018 0000                       1555  1 ASASVITN DC    X'0000'       ALL: ITN

                                  1556  1 ********************************************************************************
                                  1557  1 **        RUECKKEHR - PARAMETER                                               **
                                  1558  1 ********************************************************************************
                    000013        1559  1 ASASVRTN EQU   ASARETRN
                    000000        1560  1 ASASVGK   EQU   X'00'         ALL: REQUEST HONOURED
                    000004        1561  1 ASASVFE   EQU   X'04'         ALL: FORMALER FEHLER:
                                  1562  1 *                             ALL: - ILLEGAL SUBFUNCTION
                                  1563  1 *                        SAV/USV: - 2 BYTE ITN
                                  1564  1 *                        SAV/USV: - NEITHER TSN NOR ITN GIVEN
                    000008        1565  1 ASASVONT EQU   X'08'             SAV: FOR OWN TASK FUNCTION NOT EXECUTED
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                          00000C         1566  1 ASASVMEM EQU  X'0C'          SAV: NO MEMORY AVAILABLE FOR SAVE
                          000010         1567  1 ASASVNSV EQU  X'10'          USV: NOTHING SAVED FOR THIS TASK
                          000014         1568  1 ASASVNAP EQU  X'14'          SAV: NOT ALL PCBS ARE SAVED
                          000018         1569  1 ASASVCAN EQU  X'18'          ALL: FUNCTION NOT AVAILABLE FOR SOME DAYS
                                         1570  1 *                                 THIS RC CAN ONLY BE ACTIVATED BY REPS
                          00001C         1571  1 ASASVNMR EQU  X'1C'          SAV: FUNCTION CALLED BY TOO MANY TASKS
                          000020         1572  1 ASASVTNF EQU  ASASETNF SAV/USV: TSN/ITN DOES NOT EXIST
                          000024         1573  1 ASASVNTT EQU  X'24'    SAV/USV: ANOTHER TASKS IS EXECUTING
                                         1574  1 *                                 THIS FUNCTION. TRY IT LATER.


00001A 0000                              1575  1 ASASVPB# DC   H'0'              ANZAHL DER GESAVTEN PCB'S. NUR DANN
                                         1576  1 *                              GESETZT, IF RTN = 'SVGK' ODER 'SVNAP'

                          00001C         1577  1 ASASVLEN EQU  *-ASASERVE



                                         1578  1 ********************************************************************
                                         1579  1 **                                                                **
                                         1580  1 **                  G E T   D A T E                               **
                                         1581  1 **                  ---------------                               **
                                         1582  1 **     LIEFERT TAGESDATUM, UHRZEIT UND BISHER VERBRAUCHTE CPU-ZEIT  **
                                         1583  1 **                                                                **
                                         1584  1 ********************************************************************
                          000014         1585  1          ORG   ASALABEL
                                         1586  1 ********************************************************************
                                         1587  1 **             HEADER - PARAMETER                                 **
                                         1588  1 ********************************************************************
                          000038         1589  1 ASAGD    EQU   X'38'            FUNCTION = GET DATE
                                         1590  1 *                              ES GIBT KEINE SUBFUNCTIONS
                          000000         1591  1 ASAGDMAX EQU   X'00'            MAXIMALE SUBFUNCTION-#

                                         1592  1 ********************************************************************
                                         1593  1 **             AUFRUF - PARAMETER                                 **
                                         1594  1 ********************************************************************
                                         1595  1 *
                                         1596  1 *       -----  K E I N E  -----
                                         1597  1 *


                                         1598  1 ********************************************************************
                                         1599  1 **             RUECKKEHR - PARAMETER                              **
                                         1600  1 ********************************************************************
                          000013         1601  1 ASAGDRTN EQU   ASARETRN     ALL: RETURN-CODE
                          000000         1602  1 ASAGDOK  EQU   X'00'         ALL: ALLES OK
                          000004         1603  1 ASAGDFE  EQU   X'04'         ALL: FORMALER FEHLER
                                         1604  1 *                                 - SUBFUNCTION UNGLEICH X'00'


000014                                   1605  1 ASAGDXXX DS    0X
                                         1606  1 *
                                         1607  1 *             DATUM IST IN ZEICHENDARSTELLUNG IN DER FORM:
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        1608  1 *                          YY/MM/TTIIIB
                                        1609  1 *                WOBEI: YY   = JAHR
                                        1610  1 *                       MM   = MONAT
                                        1611  1 *                       TT   = TAG
                                        1612  1 *                       III  = JULIANISCHES DATUM
                                        1613  1 *                       B    = BLANK
                                        1614  1 *
000014 F8F161F1F161F2F0                 1615  1 ASAGDDAT DC    CL12'81/11/20321 '   TAGESDATUM

                                        1616  1 *
                                        1617  1 *                DIE TAGESZEIT IST IN ZEICHENDARSTELLUNG IN FOLGENDER
                                        1618  1 *                FORM GEGEBEN:
                                        1619  1 *                              HHMMSS
                                        1620  1 *                WOBEI:  HH    =  STUNDE
                                        1621  1 *                        MM    =  MINUTE
                                        1622  1 *                        SS    =  SEKUNDE
                                        1623  1 *
000020 F1F3F5F4F0F1                     1624  1 ASAGDTIM DC    CL6'135401'      TAGESZEIT

                                        1625  1 *
                                        1626  1 *                DIE VERBRAUCHTE CPU-ZEIT WIRD IN ZEICHENDARSTELLUNG
                                        1627  1 *                IN FOLGENDER FORM GEGEBEN:
                                        1628  1 *                        HHMMSS
                                        1629  1 *
000026 F0F0F0F1F4F2                     1630  1 ASAGDCPU DC    CL6'000142'      CPU-ZEIT
                  000018                1631  1 ASAGDLEN EQU   *-ASAGDXXX       LAENGE(RUECKKEHRPARAMETER)



                                        1632  1 ********************************************************************************
                                        1633  1 **                                                                            **
                                        1634  1 **                 H A R D W A R E  -  I N F O R M A T I O N                   **
                                        1635  1 **                 ----------------------------------------                   **
                                        1636  1 **  DIESER SERVICE IST NUR FUER SLEDFILE-ZUGRIFFE REALISIERT. ER              **
                                        1637  1 **  LIEFERT SELEKTIERTE HARDWARE-INFORMATION ZURUECK:                         **
                                        1638  1 **     - AUDIT ADRESS REGISTER                                                **
                                        1639  1 **     - ALLE CPU - LOGOUT - REGISTER                                         **
                                        1640  1 **     - ALLE IOC - LOGOUT - REGISTER                                         **
                                        1641  1 **  DER SERVICE IST AUCH UEBER 'TAM' AUFRUFBAR.                               **
                                        1642  1 ********************************************************************************
                  000014                1643  1           ORG   ASALABEL

                                        1644  1 ********************************************************************************
                                        1645  1 **               HEADER - PARAMETER                                           **
                                        1646  1 ********************************************************************************
                  00003C                1647  1 ASAHW     EQU   X'3C'            FUNKTION = HARDWARE-INFORMATION
                                        1648  1 *                                 ES GIBT KEINE SUBFUNKTIONEN. DAS FELD
                                        1649  1 *                                 'SBFCT' MUSS GLEICH X'00' SEIN.
                  000000                1650  1 ASAHWMAX EQU   X'00'            HOECHSTE SUBFUNKTIONSNUMMER

                                        1651  1 ********************************************************************************
                                        1652  1 **               AUFRUF - PARAMETER                                           **
                                        1653  1 ********************************************************************************
000014 00                               1654  1 ASAHWLNK DC    X'00'            SLEDFILE#
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                 1655  1 ********************************************************************************
                                 1656  1 **              RUECKKEHR - PARAMETER                                         **
                                 1657  1 ********************************************************************************
                          000013 1658  1 ASAHWRTN EQU   ASARETRN
                          000000 1659  1 ASAHWOK  EQU   X'00'           ALLES OK; SERVICE AUSGEFUEHRT
                          000004 1660  1 ASAHWFE  EQU   X'04'           FORMALER FEHLER:
                                 1661  1 *                             - UNGUELTIGE SUBFUNKTION
                                 1662  1 *                             - LINK# > X'07'
                          000008 1663  1 ASAHWFNO EQU   X'08'           ANGEGEBENE DUMPDATEI WURDE NOCH NICHT
                                 1664  1 *                             UEBER DEN OPEN-SERVICE ANGEMELDET
                          00000C 1665  1 ASAHWNOS EQU   X'0C'           DUMPDATEI IST KEINE SLED-DATEI
                                 1666  1 *                           ODER DUMP WURDE AUF FUJITSU-ANLAGE GEZOGEN
                          000010 1667  1 ASAHWINA EQU   X'10'           INFORMATION KONNTE NICHT ERZEUGT WERDEN

000018                           1668  1 ASAHWXXX DS    0F
000018 00000000                  1669  1 ASAHWAA0 DC    A(0)            CPU-0-AUDIT-ADRESS-REGISTER
00001C 00000000                  1670  1 ASAHWAA1 DC    A(0)            CPU-1-AUDIT-ADRESS-REGISTER
000020 00000000                  1671  1 ASAHWAA2 DC    A(0)            CPU-2-AUDIT-ADRESS-REGISTER
000024 00000000                  1672  1 ASAHWAA3 DC    A(0)            CPU-3-AUDIT-ADRESS-REGISTER
000028 00000000                  1673  1 ASAHWCR0 DC    A(0)            CPU-0-LOGOUT-REGISTER
00002C 00000000                  1674  1 ASAHWCR1 DC    A(0)            CPU-1-LOGOUT-REGISTER
000030 00000000                  1675  1 ASAHWCR2 DC    A(0)            CPU-2-LOGOUT-REGISTER
000034 00000000                  1676  1 ASAHWCR3 DC    A(0)            CPU-3-LOGOUT-REGISTER
000038 00000000                  1677  1 ASAHWIR0 DC    A(0)            IOC-0-LOGOUT-REGISTER
00003C 00000000                  1678  1 ASAHWIR1 DC    A(0)            IOC-1-LOGOUT-REGISTER
000040 00000000                  1679  1 ASAHWIR2 DC    A(0)            IOC-2-LOGOUT-REGISTER
000044 00000000                  1680  1 ASAHWIR3 DC    A(0)            IOC-3-LOGOUT-REGISTER
000048 00000000                  1681  1 ASAHWIR4 DC    A(0)            IOC-4-LOGOUT-REGISTER
00004C 00000000                  1682  1 ASAHWIR5 DC    A(0)            IOC-5-LOGOUT-REGISTER
000050 00000000                  1683  1 ASAHWIR6 DC    A(0)            IOC-6-LOGOUT-REGISTER
000054 00000000                  1684  1 ASAHWIR7 DC    A(0)            IOC-7-LOGOUT-REGISTER
                          000040 1685  1 ASAHWLEN EQU   *-ASAHWXXX      LAENGE DER RETURN-PARAMETER



                                 1686  1 ********************************************************************************
                                 1687  1 **                                                                            **
                                 1688  1 **                  D A T A    T R A N S P O R T                          **
                                 1689  1 **                  -------------------------                                 **
                                 1690  1 **  DIESER SERVICE TRANSPORTIERT ZUSAMMENHAENGENDE SPEICHERBEREICHE          **
                                 1691  1 **  VON EINER AUSGANGS-ADRESSE AUF EINE ZIEL-ADRESSE.                        **
                                 1692  1 ********************************************************************************
                          000014 1693  1          ORG   ASALABEL

                                 1694  1 ********************************************************************************
                                 1695  1 **              HEADER - PARAMETER                                            **
                                 1696  1 ********************************************************************************
                          000040 1697  1 ASAMC    EQU   X'40'           FUNCTION =DATA MANIPULATION
                          000000 1698  1 ASAMCM   EQU   X'00'           SUBFUNCTION = MOVE DATA
                          000000 1699  1 ASAMCMAX EQU   X'00'           MAX. # OF SUBFUNCTION

                                 1700  1 ********************************************************************************
                                 1701  1 **              AUFRUF - PARAMETER                                            **
                                 1702  1 ********************************************************************************
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000014 0000                         1703  1 ASAMCLGH DC    H'0'              # OF BYTES TO PROCESS
                                        1704  1 *
                                        1705  1 *               DEF OF SOURCE (S)
                                        1706  1 *
    000018                              1707  1 ASAMCSRC DS    0F                START OF SOURCEPARAMS
    000018 00000000                     1708  1 ASAMCSAD DC    A(0)          CH  ADDR OF S; IF 'ASAMCSKY'='ASAMCSPL'
                                        1709  1 *                               THEN ADDRESS OF BUFFER (WORD-ALIGNED)
    00001C 00000000                     1710  1 ASAMCSTS DC    A(0)          CH  TSN OF S; A(0) = DEFAULTTASK
    000020 00000000                     1711  1 ASAMCSP# DC    A(0)          CH  # OF PAM PAGE, IF ACCESS TO DUMPFILE
    000024 00000000                     1712  1 ASAMCSPA DC    A(0)          CH  REL. ADDRESS WITHIN 1 MB RANGE
    000028 0000                         1713  1 ASAMCSIT DC    H'0'          CH  ITN OF S; X'0000' = DEFAULT-TASK
    00002A 0000                         1714  1 ASAMCSDR DC    H'0'              DSECT-RELATIVE ADDRESS IF MCSST IS SET
    00002C 00                           1715  1 ASAMCSLN DC    X'00'             LINKNAME OF DUMPFILE, IF MCSDT SET
    00002D 00                           1716  1 ASAMCSFB DC    X'00'             FLAGBYTE FOR S
                  000000                1717  1 ASAMCSTN EQU   ASAITN        CH  NICHT VERWENDET
                  000000                1718  1 ASAMCSTV EQU   ASATSN        CH  NICHT VERWENDET
                  000000                1719  1 ASAMCSTI EQU   ASAMCSTV+ASAMCSTN  NICHT VERWENDET
                  000040                1720  1 ASAMCSPV EQU   X'40'         CH  MCSP# & MCSPA ARE VALID
                  000020                1721  1 ASAMCSPH EQU   X'20'         CH  'MCSAD' IST REALE ADRESSE
                  000010                1722  1 ASAMCSDT EQU   ASADUMP           READ IN DUMPED TASK, ID # IN
                  000008                1723  1 ASAMCSTP EQU   X'08'             TRANSFORM TESTPOINTS IN S
                  000001                1724  1 ASAMCSCQ EQU   X'01'             CHECK BIT, NO VALIDATION FOR S
    00002E 00                           1725  1 ASAMCSF2 DC    X'00'             FLAGBYTE 2; NOT YET USED
    000030                              1726  1          DS    0H                ALIGNMENT
    000030 00                           1727  1 ASAMCSKY DC    X'00'             INDICATOR FOR KEYWORDS/REGISTERS
                  000000                1728  1 ASAMCSNO EQU   X'00'             NO KEYWORD
                  000004                1729  1 ASAMCSR  EQU   X'04'             REGISTER, SEE MCSNR FOR NUMBER
                  000008                1730  1 ASAMCSCC EQU   X'08'             CONDITION CODE
                  00000C                1731  1 ASAMCSPC EQU   X'0C'             PROGRAM COUNTER
                  000010                1732  1 ASAMCSPM EQU   X'10'             PROGRAM MASK
                  000014                1733  1 ASAMCSPB EQU   X'14'             PROCESS CONTROL BLOCK;SEE MCPNR
                  000018                1734  1 ASAMCSPL EQU   X'18'             NOT USED
                  00001C                1735  1 ASAMCSFR EQU   X'1C'             INT. FLAG REGISTER
                  000020                1736  1 ASAMCSMR EQU   X'20'             INT. MASK REGISTER
                  000024                1737  1 ASAMCSSR EQU   X'24'             INT. STATUS REGISTER
                  000028                1738  1 ASAMCSJC EQU   X'28'             JOB CONTROL BLOCK
                  00002C                1739  1 ASAMCSJT EQU   X'2C'             JOB TO BE PROCESSED BLOCK
                  000030                1740  1 ASAMCSTB EQU   X'30'             TASK CONTROL BLOCK
                  000034                1741  1 ASAMCSFC EQU   X'34'             FCB; LINK IS IN ASAMCFLK
                  00003E                1742  1 ASAMCSKS EQU   X'3E'     LIMIT # FOR TASK-DEPENDAND KEYS
                  000040                1743  1 ASAMCSXV EQU   X'40'             EXECUTIVE VECTOR TABLE
                  000044                1744  1 ASAMCSSC EQU   X'44'             SPEICHER-KLASSE; GIB IN 'MCSPN'
                                        1745  1 *                               DIE SPEICHERKLASSE AN
                  000048                1746  1 ASAMCSGR EQU   X'48'             FLOATING-POINT-REGISTERS
                  000048                1747  1 ASAMCSMX EQU   X'48'             MAX. # OF KEY
    000031 00                           1748  1 ASAMCSST DC    X'00'             INDICATOR FOR SYST.TABLE SYMBOLS
                  000000                1749  1 ASAMCSNS EQU   X'00'             NO SYMBOL
                                        1750  1 *                               &I.MCSST HOLDS AN IDENTIFICATION# FOR THE PARENT-
                                        1751  1 *                               DSECT (X'00'-X'FF') OF THE SYSTEM-TABLE-SYMBOL
                                        1752  1 *                               IN QUESTION.
                  000000                1753  1 ASAMCSSS EQU   X'00'             MAXIMUM ID-NUMBER OF PARENT-
                                        1754  1 *                               DSECT OF TASK-INDEPENDAND STS-
                                        1755  1 *                               SYMBOL. DSECTS MUST BE SORTED
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        1756  1 *                                  IN A WAY THAT ALL TASK-INDE-
                                        1757  1 *                                  PENDAND TABLES HAVE LOWER NUM-
                                        1758  1 *                                  BERS, WHILE ALL TASK-DEPENDAND
                                        1759  1 *                                  TABLES ARE PUT TOGETHER WITH
                                        1760  1 *                                  HIGHER NUMBERS.
                          00001B        1761  1 ASAMCSSX EQU   X'1B'              MAX. ALLOWED IDENTIFICATION#
000032 00                               1762  1 ASAMCSRN DC    X'00'              0-15: NR OF REGISTER
                          000010        1763  1 ASAMCSAR EQU   X'10'              ALL REGISTERS
000033 00                               1764  1 ASAMCSPN DC    X'00'              0    : USER GAVE NO INDEX
                                        1765  1 *                                 N    : - N-TER STACK
                                        1766  1 *                                 FALLS 'MCSKY'='MCSSC', DANN MUSS
                                        1767  1 *                                 HIER DIE SPEICHERKLASSE STEHEN.
                          000000        1768  1 ASAMCSC1 EQU   X'00'              SPEICHER-KLASSE 1
                          000004        1769  1 ASAMCSC2 EQU   X'04'              SPEICHER-KLASSE 2
                          000008        1770  1 ASAMCSC3 EQU   X'08'              SPEICHER-KLASSEN 3/4
                          00000C        1771  1 ASAMCSC5 EQU   X'0C'              SPEICHER-KLASSE 5
                          000010        1772  1 ASAMCSC6 EQU   X'10'              SPEICHER-KLASSE 6
000034 D3C9D5D2D5C1D4C5                 1773  1 ASAMCFLK DC    CL8'LINKNAME'      LINKNAME FOR FCB(ASAMCSFC)



                                        1774  1 ************************************************************************
                                        1775  1 **              DEFINITION OF DESTINATION                             **
                                        1776  1 ************************************************************************

                          00003C        1777  1 ASAMCDRC EQU   *                        BEGINNING OF DESTINATION PARAMS
00003C 00000000                         1778  1 ASAMCDAD DC    A(0)          CH     ADDR OF D; WILL NOT BE REGARDED, IF
                                        1779  1 *                                  MCDKY OR MCDST IS SET
000040 00000000                         1780  1 ASAMCDTS DC    A(0)          CH     TSN OF D; A(0) = DEFAULT-TASK
000044 00000000                         1781  1 ASAMCDP# DC    A(0)          CH     # OF PAM PAGE IF ACCESS TO DUMP FILE
000048 00000000                         1782  1 ASAMCDPA DC    A(0)          CH     REL. ADDRESS WITHIN 1 MB RANGE
00004C 0000                             1783  1 ASAMCDIT DC    H'0'          CH     ITN OF D; X'0000' = DEFAULT - TASK
00004E 0000                             1784  1 ASAMCDDR DC    H'0'                 DSECT-RELATIVE ADDRESS, IF MCDST SET
000050 00                               1785  1 ASAMCDLN DC    X'00'                LINKNUMBER OF DUMPFILE, IF MCDDT SET
000051 00                               1786  1 ASAMCDFB DC    X'00'                FLAGBYTE FOR D
                          000001        1787  1 ASAMCDCQ EQU   ASAMCSCQ             CHECK BIT, NO VALIDATION FOR D
                          000000        1788  1 ASAMCDTN EQU   ASAMCSTN             NICHT VERWENDET
                          000008        1789  1 ASAMCDTP EQU   ASAMCSTP             TRANSFORM TESTPOINTS IN D
                          000010        1790  1 ASAMCDDT EQU   ASAMCSDT             READ IN DUMPED TASK, ID # IN 'MCDIT'
                          000020        1791  1 ASAMCDPH EQU   ASAMCSPH       CH    'MCDAD' IST REALE ADRESSE
                          000040        1792  1 ASAMCDPV EQU   ASAMCSPV       CH    MCDP# & MCDPA ARE VALID
                          000000        1793  1 ASAMCDTV EQU   ASAMCSTV             NICHT VERWENDET
                          000000        1794  1 ASAMCDTI EQU   ASAMCSTI             NICHT VERWENDET
000052 00                               1795  1 ASAMCDF2 DC    X'00'                FLAGBYTE 2
                          000080        1796  1 ASAMCDRO EQU   ASAWRO              IGNORE READ-ONLY-PROTECTION
000054                                  1797  1               DS    0H             ALIGNMENT
000054 00                               1798  1 ASAMCDKY DC    X'00'                INDICATOR FOR KEYWORDS/REGISTERS
                          000000        1799  1 ASAMCDNO EQU   ASAMCSNO             NO KEYWORD
                          000004        1800  1 ASAMCDR  EQU   ASAMCSR              REGISTER, SEE MCDNR FOR NUMBER
                          000008        1801  1 ASAMCDCC EQU   ASAMCSCC             CONDITION CODE
                          00000C        1802  1 ASAMCDPC EQU   ASAMCSPC             PROGRAM COUNTER
                          000010        1803  1 ASAMCDPM EQU   ASAMCSPM             PROGRAM MASK
                          000014        1804  1 ASAMCDPB EQU   ASAMCSPB             PROCESS CONTROL BLOCK;SEE MCPNR
                          00001C        1805  1 ASAMCDFR EQU   ASAMCSFR             INT. FLAG REGISTER
                          000020        1806  1 ASAMCDMR EQU   ASAMCSMR             INT. MASK REGISTER
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                          000024         1807  1 ASAMCDSR EQU   ASAMCSSR          INT. STATUS REGISTER
                          000028         1808  1 ASAMCDJC EQU   ASAMCSJC          JOB CONTROL BLOCK
                          00002C         1809  1 ASAMCDJT EQU   ASAMCSJT          JOB TO BE PROCESSED BLOCK
                          000030         1810  1 ASAMCDTB EQU   ASAMCSTB          TASK CONTROL BLOCK
                          000040         1811  1 ASAMCDXV EQU   ASAMCSXV          EXECUTIVE VECTOR TABLE
                          000048         1812  1 ASAMCDGR EQU   ASAMCSGR          FLOATING-POINT-REGISTERS
                          000048         1813  1 ASAMCDMX EQU   ASAMCSMX          MAX. # OF KEY
000055 00                                1814  1 ASAMCDST DC    X'00'             INDICATOR FOR SYST.TABLE SYMBOLS
                          000000         1815  1 ASAMCDNS EQU   0                 NO SYMBOL
000056 00                                1816  1 ASAMCDRN DC    X'00'             0-15: NR OF REGISTER
                          000010         1817  1 ASAMCDAR EQU   16                ALL REGISTERS
000057 00                                1818  1 ASAMCDPN DC    X'00'             0    : CURRENT STACK
                                         1819  1 *                              N    : - N-TER PCB


                                         1820  1 ********************************************************************************
                                         1821  1 **              RUECKKEHR - PARAMETER                                   **
                                         1822  1 ********************************************************************************
                          000013         1823  1 ASAMCRTN EQU   ASARETRN          RETURN PARAM
                          000000         1824  1 ASAMCOK  EQU   X'00'             ALL O.K.; BUT SEE ASAMCFB
                          000004         1825  1 ASAMCFE  EQU   X'04'             FORMALER FEHLER:
                                         1826  1 *                              - SUBFUNKTION UNGLEICH X'00'
                                         1827  1 *                              - LAENGE = X'0000', ABER KEIN
                                         1828  1 *                                KEYWORD GEGEBEN
                                         1829  1 *                              - DUMPFILE-LINK# > 7
                                         1830  1 *                              - UNGUELTIGE KEY#
                                         1831  1 *                              - SCHREIBEN IN TRACETABLE
                                         1832  1 *                              - UNGUELTIGES REGISTER
                          000008         1833  1 ASAMCV   EQU   X'08'             ERROR IN S AND/OR D, SEE MCSER & MCDER
                          00000C         1834  1 ASAMCDT1 EQU   X'0C'             DUMPDATEI EXISTIERT NICHT
                          000010         1835  1 ASAMCDT2 EQU   X'10'             NICHT VERWENDET
                          000014         1836  1 ASAMCIT1 EQU   X'14'             ITN IN S NOT FOUND
                          000018         1837  1 ASAMCIT2 EQU   X'18'             ITN IN D NOT FOUND
                          00001C         1838  1 ASAMCPN1 EQU   X'1C'             INDICATED STACK NOT FOUND IN S
                                         1839  1 *                              OR NOT SAVED
                          000020         1840  1 ASAMCPN2 EQU   X'20'             INDICATED STACK NOT FOUND IN D
                          000024         1841  1 ASAMCBD1 EQU   X'24'             SOURCE BOUNDARIES VIOLATED
                          000028         1842  1 ASAMCBD2 EQU   X'28'             D - BOUNDARIES VIOLATED
                          00002C         1843  1 ASAMCTS1 EQU   X'2C'             TSN IN S NOT FOUND
                          000030         1844  1 ASAMCTS2 EQU   X'30'             TSN IN D NOT FOUND
                          000034         1845  1 ASAMCTK1 EQU   X'34'             NO TASK SPECIFIED FOR S
                          000038         1846  1 ASAMCTK2 EQU   X'38'             NO TASK SPECIFIED FOR D
                          00003C         1847  1 ASAMCPH1 EQU   X'3C'             ZUGRIFF UEBER EINE REALE ...
                          000040         1848  1 ASAMCPH2 EQU   X'40'             ... ADRESSE IST NICHT MOEGLICH
                          000044         1849  1 ASAMCN4  EQU   X'44'             NO CLASS4 MEMORY AVAILABLE; ACCESS
                                         1850  1 *                              TO SYSTEM-ADDRESS IMPOSSIBLE
                          000048         1851  1 ASAMCCM  EQU   X'48'             UEBERTRAGUNG ZWISCHEN 2 FREMDEN TASKS
                                         1852  1 *                              IST NICHT ERLAUBT
                          00004C         1853  1 ASAMCSEM EQU   X'4C'             ANOTHER TASK ACCESSES SAME PAGE
                                         1854  1 *                              YOU MAY RETRY LATER
                          000050         1855  1 ASAMCCMO EQU   X'50'             ACCESS OF DIFFERENT SEGMENTS OF
                                         1856  1 *                              FOREIGN TASKS NOT ALLOWED
                          000054         1857  1 ASAMCSCN EQU   X'54'             FGN ADDR SPACE CANNOT BE ACCESSED
                          000058         1858  1 ASAMCXNE EQU   X'58'             SPECIFIED TABLE DOES NOT EXIST OR
                                         1859  1 *                              NOT ACCESSABLE OR NOT SAVED
```

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FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                          00005C         1860  1 ASAMCLNA EQU   X'5C'          ILLEGAL WRITE-ACCESS TO READ-ONLY
                                         1861  1 *                             PAGE
                          000060         1862  1 ASAMCNYI EQU   X'60'          FUNCTION NOT YET IMPLEMENTED
                          000064         1863  1 ASAMCSDA EQU   X'64'          ALLOCATION ERROR IN S/D
                          000068         1864  1 ASAMCTNM EQU   X'68'          NO MEMORY FOR TRACETABLE
                          00006C         1865  1 ASAMCNLS EQU   X'6C'          FCB REQUESTED WITHOUT SPECIFYING
                                         1866  1 *                             LINK-NAME
                          000070         1867  1 ASAMCFNO EQU   X'70'          FILE WITH SPECIFIED LINKNAME NOT
                                         1868  1 *                             OPEN (FCB REQUESTED)
                          000074         1869  1 ASAMCMCN EQU   X'74'          ANGEGEBENE SPEICHERKLASSE
                                         1870  1 *                             EXISTIERT NICHT
                          000074         1871  1 ASAMCPL  EQU   X'74'          MAXIMUM VALUE OF RETURN-CODE

000058                                   1872  1 ASAMCXXX DS    0X
000058 00                                1873  1 ASAMCFB  DC    X'00'          FLAGBYTE
                          000080         1874  1 ASAMCLA  EQU   X'80'          GIVEN LENGTH VIOLATED S- OR D-
                                         1875  1 *                             BOUNDARIES; LENGTH HAS BEEN
                                         1876  1 *                             ADJUSTED ACCORDINGLY
                          000040         1877  1 ASAMCINF EQU   X'40'          NO LENGTH GIVEN; INFORM ONLY
                                         1878  1 *                             SEE MCSAD, MCDAD, MCLGH FOR RETURN
                          000020         1879  1 ASAMCNC1 EQU   X'20'          TOO MANY ENTRIES IN SAVEMOVE;
                                         1880  1 *                             D COULD NOT BE SAVED
                          000010         1881  1 ASAMCNC2 EQU   X'10'          NO MEMORY FOR COPY OF D;
                                         1882  1 *                             D COULD NOT BE SAVED
                          000008         1883  1 ASAMCSEG EQU   X'08'          MOVE INTO/OUT OF FOREIGN TASK
                                         1884  1 *                             VIOLATES SEGMENT-BOUNDARY; ONLY
                                         1885  1 *                             'MCTNP' BYTES MOVED; REPEAT
                                         1886  1 *                             NEW ADDRESS
                          000004         1887  1 ASAMCQUL EQU   ASAUQUAL       UEBERQUALIFIZIERTE EINGABE

000059 00                                1888  1 ASAMCCC  DC    X'00'          CONDITION CODE, (NOT YET IMPLEMENTED)
                          000080         1889  1 ASAMCEQ  EQU   X'80'          S = D   )    USEFUL AS MASK
                          000040         1890  1 ASAMCLT  EQU   X'40'          S < D   >    FOR A EX ON A BC
                          000020         1891  1 ASAMCGT  EQU   X'20'          S > D   )    OR A BCR

00005A                                   1892  1 ASAMCERR DS    0H
00005A 00                                1893  1 ASAMCSER DC    X'00'          ERROR FLAGBYTE FOR SOURCE
                          000080         1894  1 ASAMCSNA EQU   X'80'          PAGE NOT DUMPED, COULD NOT BE ACCESSED
                          000040         1895  1 ASAMCSOB EQU   X'40'          PAGE NOT DUMPED, NOT WITHIN
                                         1896  1 *                             LIMITS OF DUMP
                          000020         1897  1 ASAMCSNE EQU   X'20'          PAGE NOT ALLOCATED
                          000010         1898  1 ASAMCSDP EQU   X'10'          DUMP PRIVILEGE TOO SMALL,
                                         1899  1 *                             PAGE NOT DUMPED
                          000001         1900  1 ASAMCSPR EQU   X'01'          TESTPRIV TOO SMALL
                          000002         1901  1 ASAMCSPG EQU   X'02'          TESTPRIV IN ANY CASE TOO SMALL
00005B 00                                1902  1 ASAMCDER DC    X'00'          ERROR FLAGBYTE FOR D
                          000080         1903  1 ASAMCDNA EQU   ASAMCSNA       PAGE NOT DUMPED, COULD NOT BE ACCESSED
                          000040         1904  1 ASAMCDOB EQU   ASAMCSOB       PAGE NOT DUMPED, NOT WITHIN
                                         1905  1 *                             LIMITS OF DUMP
                          000020         1906  1 ASAMCDNE EQU   ASAMCSNE       PAGE NOT ALLOCATED
                          000010         1907  1 ASAMCDDP EQU   ASAMCSDP       DUMP PRIVILEGE TOO SMALL,
                                         1908  1 *                             PAGE NOT DUMPED
                          000001         1909  1 ASAMCDPR EQU   ASAMCSPR       TESTPRIV TOO SMALL
                          000002         1910  1 ASAMCDPG EQU   ASAMCSPG       TESTPRIV IN ANY CASE TOO SMALL
                          000004         1911  1 ASAMCDGR EQU   X'04'          WRITE INTO DUMP-FILE
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FLAG LOCTN OBJECT CODE     ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

    00005C 00000000                      1912  1 ASAMCBYT DC    A(0)              ANZAHL DER BEARBEITETEN BYTES
                       00005E            1913  1          ORG   ASAMCBYT+2
    00005E 0000                          1914  1 ASAMCTNP DC    H'0'              # OF TILL NOW PROCESSED BYTES
                                         1915  1 *                                DIESES FELD IST NUR NOCH AUS
                                         1916  1 *                                KOMPATIBILITAETSGRUENDEN DA.
    000060 00                            1917  1 ASAMCSSB DC    X'00'             STATUS OF FLAGGED BYTES FOR S
    000061 00                            1918  1 ASAMCDSB DC    X'00'             STATUS OF FLAGGED BYTES FOR D
    000062 00                            1919  1 ASAMCTYP DC    X'00'             TASK-TYPE (SEE TCB)
    000063 00                            1920  1 ASAMCPND DC    X'00'             PEND-TYPE (SEE TCB)
    000064 0000                          1921  1 ASAMCQ   DC    H'0'              QUEUE #
    000068 00000000                      1922  1 ASAMCTCB DC    A(0)              A(TCB)
                       000014            1923  1 ASAMCLEN EQU   *-ASAMCXXX        LENGTH(RET.PARAMS)
                                         1924  1 ********************************************************************
                                         1925  1 **                                                                **
                                         1926  1 **          Z U G R I F F   A U F   A I D - T E X T D A T E I     **
                                         1927  1 **          ---------------------------------------------     **
                                         1928  1 **  ZUGRIFF AUF VOM AUFRUFER ANGEGEBENE DATEI UEBER EINEN ISAM-   **
                                         1929  1 **  SATZSCHLUESSEL.                                               **
                                         1930  1 **                                                                **
                                         1931  1 ********************************************************************
                       000014            1932  1          ORG   ASALABEL

                                         1933  1 ********************************************************************
                                         1934  1 **              HEADER - INFORMATION                              **
                                         1935  1 ********************************************************************
                       000044            1936  1 ASAHP    EQU   X'44'             FUNCTION = ACCESS AID-TEXT-DATEI
                       000000            1937  1 ASAHPMAX EQU   X'00'             MAXIMUM SUBFUNCTION #

                                         1938  1 ********************************************************************
                                         1939  1 **              AUFRUF - PARAMETER                                **
                                         1940  1 ********************************************************************
    000014 0000                          1941  1 ASAHPLSC DC    Y(0)              LENGTH OF SEARCH-CRITERIA (VALUES
                                         1942  1 *                                1 - 155 ALLOWED ONLY)
    000016 C3D9C9E3C5D9C9C1              1943  1 ASAHPSC  DC    'CRITERIA'        SEARCH-CRITERIA
    000020 00000000                      1944  1 ASAHPABA DC    A(0)              ADDRESS OF USER BUFFER
    000024 0000                          1945  1 ASAHPLBA DC    Y(0)              LENGTH OF USER BUFFER
    000026 C6C9D3C5D5C1D4C5              1946  1 ASAHPNAM DC    CL17'FILENAME'    NAME OF HELPFILE

                                         1947  1 ********************************************************************
                                         1948  1 **              RUECKKEHR - PARAMETER                             **
                                         1949  1 ********************************************************************
                       000013            1950  1 ASAHPRTN EQU   ASARETRN          RETURN-CODE
                       000000            1951  1 ASAHPOK  EQU   X'00'             RETURN O.K.
                       000000            1952  1 ASAHPEOI EQU   X'00'             RETURN O.K. END OF INFO
                       000004            1953  1 ASAHPFE  EQU   X'04'             FORMALER FEHLER:
                                         1954  1 *                                - CALLER IS NOT AID
                                         1955  1 *                                - ANY INPUT EQUALS TO ZERO
                                         1956  1 *                                - A(BUFFER) IS NOT ALLOCATED
                                         1957  1 *                                - BUFFER NOT WORD-ALIGNED
                                         1958  1 *                                - LENGTH(SEARCH-CRITERIA) > 255
                                         1959  1 *                                - UNGUELTIGE SUBFUNKTION
                       000008            1960  1 ASAHPNIA EQU   X'08'             RETURN NO INFO AVAIL
                       00000C            1961  1 ASAHPFNO EQU   X'0C'             FILE COULD NOT BE OPENED
                       000010            1962  1 ASAHPTAP EQU   X'10'             BANDDATEIZUGRIFF NICHT ERLAUBT
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

    000037                              1963  1 ASAHPXXX DS    0X
    000037 0000                         1964  1 ASAHPERR DC    XL2'00'          DMS-ERRORCODE, FALLS RTN = 'HPFNO'
                          000002        1965  1 ASAHPLEN EQU   *-ASAHPXXX       LENGTH OF RETURN-PARAMS
                                        1966  1 ************************************************************************
                                        1967  1 **                                                                    **
                                        1968  1 **        G E T  T E R M I N A L I N F O R M A T I O N                 **
                                        1969  1 **        ------------------------------------------                  **
                                        1970  1 **                                                                    **
                                        1971  1 ************************************************************************
                          000014        1972  1          ORG   ASALABEL

                                        1973  1 ************************************************************************
                                        1974  1 **              HEADER - PARAMETER                                    **
                                        1975  1 ************************************************************************
                          000048        1976  1 ASATM    EQU   X'48'            FUNCTION = GET TERMINAL INFORMATION
                          000000        1977  1 ASATMMAX EQU   X'00'            MAX. # OF SUBFUNCTION

                                        1978  1 ************************************************************************
                                        1979  1 **              AUFRUF - PARAMETER                                    **
                                        1980  1 ************************************************************************
                                        1981  1 *
                                        1982  1 *        ----- K E I N E  -----
                                        1983  1 *


                                        1984  1 ************************************************************************
                                        1985  1 **              RUECKKEHR - PARAMETER                                 **
                                        1986  1 ************************************************************************
                          000013        1987  1 ASATMRTN EQU   ASARETRN         RETURN-CODE
                          000000        1988  1 ASATMOK  EQU   X'00'            REQUEST HONORED
                          000004        1989  1 ASATMFE  EQU   X'04'            FORMALER FEHLER
                                        1990  1 *                              - AUFRUFER IST NICHT 'AID'
                                        1991  1 *                              - UNGUELTIGE SUBFUNKTION
    000014                              1992  1 ASATMXXX DS    0X

                                        1993  1 ************************************************************
                                        1994  1 *      IF ANY ONE OF THE FOLLOWING ELEMENTS IS X'00', THEN *
                                        1995  1 *      THE CORRESPONDING DEVICE IS NOT AVAILABLE.          *
                                        1996  1 ************************************************************
    000014 00                           1997  1 ASATMTLL DC    X'00'            TERMINAL LINE LENGTH
    000015 00                           1998  1 ASATMHCL DC    X'00'            HARDCOPY LINE LENGTH
    000016 00                           1999  1 ASATMPLL DC    X'00'            PRINTER LINE LENGTH

    000018 00000000                     2000  1 ASATMTSN DC    A(0)             TSN OF TASK IN CONTROL
    00001C 0000                         2001  1 ASATMITN DC    Y(0)             ITN OF TASK IN CONTROL
                          00000A        2002  1 ASATMLEN EQU   *-ASATMXXX       LENGTH OF RETURN PARAMS
                                        2003  1 ************************************************************************
                                        2004  1 **                                                                    **
                                        2005  1 **       A I D S Y S   D E S C R I P T O R   S E R V I C E            **
                                        2006  1 **       ------------------------------------------------             **
                                        2007  1 **                                                                    **
                                        2008  1 **       THIS FUNCTION SATISFIES ALL OF THE FOLLOWING AIDSYS-          **
                                        2009  1 **       DESCRIPTOR REQUESTS:                                         **
                                        2010  1 **                                                                    **
                                        2011  1 **             - CREATION OF AN AIDSYS-DESCRIPTOR TO A SPECIFIED      **
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        2012  1 **              LEVEL FOR A GIVEN NAMED ITEM.  THE POSSIBLE LEVELS **
                                        2013  1 **              IN DESCENDING ORDER ARE:                            **
                                        2014  1 **                                                                  **
                                        2015  1 **                  LOAD MODULE   (= ADDRESS OF LMIR)               **
                                        2016  1 **                  SOURCE MODULE (= ADDRESS OF SMREC)              **
                                        2017  1 **                  OBJECT MODULE (= ADDRESS OF MIREC)              **
                                        2018  1 **                  CSECT         (= ADDRESS OF CSREC);             **
                                        2019  1 **                                                                  **
                                        2020  1 **            - CREATION OF A COMPLETE AIDSYS-DESCRIPTOR FOR A      **
                                        2021  1 **              GIVEN VIRTUAL ADDRESS; AND                          **
                                        2022  1 **                                                                  **
                                        2023  1 **            - DESCRIBE THE ENVIRONMENT OF A GIVEN AIDSYS-         **
                                        2024  1 **              DESCRIPTOR IN THE FOLLOWING FORM:                   **
                                        2025  1 **                                                                  **
                                        2026  1 **                  NAME OF THE PROGRAMM (FROM PCLST)               **
                                        2027  1 **                  PROGRAMM LOAD ADDRESS (FROM PCLST)              **
                                        2028  1 **                  NAME OF THE LOAD MODULE (FROM LMIR)             **
                                        2029  1 **                  RELATIVE LOAD ADDRESS OF THE LM (FROM LMIR)     **
                                        2030  1 **                  NAME OF THE SOURCE MODULE (FROM SMREC)          **
                                        2031  1 **                  ADDRESS OF THE FIRST SM IN THE SM (FROM MIREC)  **
                                        2032  1 **                  NAME OF THE OBJECT MODULE (FROM MIREC)          **
                                        2033  1 **                  RELATIVE LOAD ADDRESS OF THE OM (FROM MIREC)    **
                                        2034  1 **                  NAME OF THE CSECT (FROM CSREC)                  **
                                        2035  1 **                  RELATIVE ADDRESS OF THE CSECT (FROM CSREC)      **
                                        2036  1 **                  INDICATOR AS TO WHETHER LSD OR ISD INFORMATION **
                                        2037  1 **                     IS AVAILABLE                                 **
                                        2038  1 **                                                                  **
                                        2039  1 ********************************************************************
                  000014                2040  1           ORG   ASALABEL
                                        2041  1 *               UNIVERSAL INPUT PARAMETERS
                                        2042  1 *
                  00004C                2043  1 ASADS    EQU X'4C'              FUNCTION: DESCRIPTOR SERVICES
                  000004                2044  1 ASADSCFN EQU X'04'              SUBFCT: CREATE AD FROM NAME
                  000008                2045  1 ASADSCFA EQU X'08'              SUBFCT: CREATE AD FROM VIRT. ADDR.
                  00000C                2046  1 ASADSENV EQU X'0C'              SUBFCT: DESCRIBE THE AD ENVIRONMENT
                  000010                2047  1 ASADSDPG EQU X'10'              SUBFCT: LIEFERE MAP-INFORMATION
                  000010                2048  1 ASADSMAX EQU X'10'              MAX. # OF SUBFUNCTION

000014 40404040                         2049  1 ASADSTSN DC    CL4' '       ALL: TSN OF ACCESSED TASK; A(0)=DEFAULT
000018 0000                             2050  1 ASADSITN DC    XL2'0000'    ALL: ITN OF ACCESSED TASK; X'00'=DEFAULT
00001A 00                               2051  1 ASADSDFN DC    XL1'00'      ALL: DUMP FILE LINK NR OF ACCESSED TASK

00001B 00                               2052  1 ASADSUSE DC    X'00'        ALL: USAGE INDICATOR: VALUES CAN BE
                  000001                2053  1 ASADSUDU EQU X'01'           ALL: DOMAINE = USER
                  000002                2054  1 ASADSUDS EQU X'02'           ALL: DOMAINE = SYSTEM
                  000000                2055  1 ASADSUTN EQU ASATSN                NICHT VERWENDET
                  000000                2056  1 ASADSUIT EQU ASAITN                NICHT VERWENDET
                  000010                2057  1 ASADSUDF EQU ASADUMP        ALL: DUMPFILE ACCESS IS REQUIRED
                  000020                2058  1 ASADSSCL EQU X'20'          DPG: SUPPLEMENTARY CALL

                                        2059  1 ********************************************************************
                                        2060  1 **   UNIVERSAL INPUT PARAMETERS WHICH MAY BE ALTERED (SUBFCTS CREATE)*
                                        2061  1 ********************************************************************
00001C                                  2062  1           DS    0F
00001C                                  2063  1 ASADSAD  DS    0CL16   ENV+DPG: AIDSYS-DESCRIPTOR (MUST BE ALL
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M 'SOURCE STATEMENT

                                        2064  1 *                                ZEROS FOR SUBFCTS 'CFN' & 'CFA'
    00001C 00000000                     2065  1 ASADSADL DC    A(0)     ENV+DPG: ADDRESS OF LMIR
    000020 00000000                     2066  1 ASADSADS DC    A(0)     ENV+DPG: ADDRESS OF SMREC
    000024 00000000                     2067  1 ASADSADO DC    A(0)     ENV+DPG: ADDRESS OF MIREC
    000028 00000000                     2068  1 ASADSADC DC    A(0)     ENV+DPG: ADDRESS OF CSREC

                                        2069  1 ************************************************************************
                                        2070  1 **              UNIVERSAL OUTPUT PARAMETERS                           **
                                        2071  1 ************************************************************************
                    000013              2072  1 ASADSRTN EQU   ASARETRN          RETURN CODES
                                        2073  1 *
                    000000              2074  1 ASADSOK  EQU X'00'          ALL: REQUEST SATISFIED
                    000004              2075  1 ASADSFE  EQU X'04'          ALL: FORMAL  ERROR
                                        2076  1 *                                - CALLER IS NOT AID
                                        2077  1 *                                - INVALID SUBFUNCTION-CODE
                                        2078  1 *                                - ONE OF INPUT-ADDRESSES IS NOT
                                        2079  1 *                                  ALLOCATED
                                        2080  1 *                                - ONE OF 'RECORDPOINTERS' DOES NOT
                                        2081  1 *                                  POINT TO INDICATED RECORD
                                        2082  1 *                                - BOTH DOMAINE=USER & DOMAINE=
                                        2083  1 *                                  =SYSTEM ARE SPECIFIED
                                        2084  1 *                                - DOMAINE=SYSTEM & LEVEL<>CSECT
                                        2085  1 *                                - DESCRIPTOR<>0 & SUBFCT='CFN'
                                        2086  1 *                                  OR SUBFCT='CFA'
                    000008              2087  1 ASADSERN EQU   X'08'          CFN: THE NAMED ITEM WAS NOT FOUND
                    00000C              2088  1 ASADSERA EQU   X'0C'          CFA: NO MATCH FOUND FOR VIRTUAL ADDRESS
                    000010              2089  1 ASADSEAD EQU   X'10'      ENV+DPG: THE AIDSYS-DESCRIPTOR IS INCORRECT
                    000014              2090  1 ASADSNPG EQU   X'14'          ALL: NO PROGRAM LOADED
                    000018              2091  1 ASADSBNA EQU   X'18'          ALL: - BUFFER NOT CLASS5 OR 6
                                        2092  1 *                                - NO BUFFER SPECIFIED THOUGH
                                        2093  1 *                                  SUBFCT=ASADSDPG
                    00001C              2094  1 ASADSEOF EQU   X'1C'          ALL: OLD FORMAT OF LOAD-INFORMATION
                    000020              2095  1 ASADSFNO EQU   X'20'          ALL: SPECIFIED FILE NOT OPEN
                    000024              2096  1 ASADSCNF EQU   X'24'          CFA: INPUT-ADDRESS IS IN CONFLICT WITH
                                        2097  1 *                                SPECIFIED (OR DEFAULT) DOMAINE
                    000028              2098  1 ASADSTNF EQU   X'28'          ALL: SPECIFIED TASK NOT FOUND
                    00002C              2099  1 ASADSSYS EQU   X'2C'          ALL: ERROR IN SYSTEM
                    000030              2100  1 ASADSNYI EQU   X'30'          DPG: NOT YET IMPLEMENTED
                    000034              2101  1 ASADSINF EQU   X'34'               DIE GEWUENSCHTE INFORMATION IST
                                        2102  1 *                                NICHT IM DUMPFILE-UMFANG ENTHALTEN
                    000038              2103  1 ASADSPV1 EQU   X'38'               TESTPRIV IST ZU KLEIN, KANN ABER
                                        2104  1 *                                ERHOEHT WERDEN.
                    00003C              2105  1 ASADSPV2 EQU   X'3C'               TESTPRIV IST ZU KLEIN UND KANN NICHT
                                        2106  1 *                                MEHR GENUEGEND ERHOEHT WERDEN
                    000040              2107  1 ASADSSLK EQU   X'40'          DPG: ANGEGEBENER LEVEL IST NICHT ERLAUBT
                    000044              2108  1 ASADSNCI EQU   X'44'          ALL: NO CSECT INFO AVAILABLE
                    000048              2109  1 ASADSPND EQU   X'48'          ALL: PAGE NOT DUMPED  (REAL SLEDFILE)
    00002C                              2110  1 ASADSXXX DS    0CL1               END OF UNIVERSAL PARAMETERS



                                        2111  1 ************************************************************************
                                        2112  1 *                                                                      *
                                        2113  1 *          SUBFUNCTION:  CREATION OF AN AIDSYS-DESCRIPTOR TO A         *
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        2114  1 *                          SPECIFIED LEVEL FOR A GIVEN NAMED ITEM      *
                                        2115  1 *                                                                      *
                                        2116  1 ************************************************************************
                          00002C        2117  1          ORG   ASADSXXX
                                        2118  1 *
                                        2119  1 *        INPUT PARAMETERS:      PARTIAL AIDSYS-DESCRIPTOR (&I.DSAD)
                                        2120  1 *
00002C C9E3C5D4D5C1D4C5                 2121  1 ASADSNAM DC    CL8'ITEMNAME'    NAME OF THE ITEM
000034 00                               2122  1 ASADSLEV DC    XL1'00'          LEVEL OF THE ITEM, THAT IS:
                                        2123  1 *
                          000004        2124  1 ASADSLLM EQU X'04'               - LOAD MODULE
                          000008        2125  1 ASADSLSM EQU X'08'               - SOURCE MODULE
                          00000C        2126  1 ASADSLOM EQU X'0C'               - OBJECT MODULE
                          000010        2127  1 ASADSLCS EQU X'10'               - CSECT
                                        2128  1 *
                                        2129  1 *        OUTPUT PARAMETERS:     AIDSYS-DESCRIPTOR (SEE &I.DSAD)
                                        2130  1 *                               RETURN CODES (SEE &I.DSRTN)
                                        2131  1 *



                                        2132  1 ************************************************************************
                                        2133  1 *                                                                      *
                                        2134  1 *        SUBFUNCTION:  CREATION OF A COMPLETE AIDSYS-DESCRIPTOR FOR A*
                                        2135  1 *                      GIVEN VIRTUAL ADDRESS                           *
                                        2136  1 *                                                                      *
                                        2137  1 ************************************************************************
                          00002C        2138  1          ORG   ASADSXXX
                                        2139  1 *
                                        2140  1 *        INPUT PARAMETERS
                                        2141  1 *
00002C 00000000                         2142  1 ASADSADR DC    A(0)             VIRTUAL ADDRESS FOR WHICH AN AIDSYS
                                        2143  1 *                               DESCRIPTOR IS REQUESTED
                                        2144  1 *
                                        2145  1 *        OUTPUT PARAMETERS:     AIDSYS-DESCRIPTOR (SEE &I.DSAD)
                                        2146  1 *                               RETURN CODES (SEE &I.DSRTN)
                                        2147  1 *
000030 00                               2148  1 ASADSDOM DC    X'00'            DOMAINE-INDICATOR
                          000001        2149  1 ASADSDUS EQU   ASADSUDU         DOMAINE = USER
                          000002        2150  1 ASADSDSY EQU   ASADSUDS         DOMAINE = SYSTEM



                                        2151  1 ************************************************************************
                                        2152  1 *                                                                      *
                                        2153  1 *        SUBFUNCTION:  DESCRIBE THE ENVIRONMENT OF A GIVEN AIDSYS-   *
                                        2154  1 *                      DESCRIPTOR                                      *
                                        2155  1 *                                                                      *
                                        2156  1 ************************************************************************
                          00002C        2157  1          ORG   ASADSXXX
                                        2158  1 *
                                        2159  1 *        INPUT PARAMETERS:      AIDSYS-DESCRIPTOR (SEE &I.DSAD)
                                        2160  1 *
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        2161  1 *
                                        2162  1 *        OUTPUT PARAMETERS:     RETURN CODES (SEE &I.DSRTN)
                                        2163  1 *
   00002C                               2164  1 ASADSEB  DS     0L65            ENVIRONMENT BLOCK
   00002C D7D9D6C7D5C1D4C5              2165  1 ASADSPRN DC     CL8'PROGNAME'   NAME OF THE PROGRAMM
   000034 00000000                      2166  1 ASADSPRA DC     A(0)            INITIAL LOAD ADDRESS OF THE PROGRAMM
   000038 D3D4D6C4D5C1D4C5              2167  1 ASADSLMN DC     CL8'LMODNAME'   NAME OF THE LOAD MODULE
   000040 00000000                      2168  1 ASADSLMA DC     A(0)            RELATIVE LOAD ADDRESS THEREOF
   000044 E2D4D6C4D5C1D4C5              2169  1 ASADSSMN DC     CL8'SMODNAME'   NAME OF THE SOURCE MODULE
   00004C 00000000                      2170  1 ASADSSMA DC     A(0)            RELATIVE LOAD ADDRESS OF FIRST OM
   000050 D6D4D6C4D5C1D4C5              2171  1 ASADSOMN DC     CL8'OMODNAME'   NAME OF THE OBJECT MODULE
   000058 00000000                      2172  1 ASADSOMA DC     A(0)            RELATIVE LOAD ADDRESS THEREOF
   00005C C3E2C5C3D5C1D4C5              2173  1 ASADSCSN DC     CL8'CSECNAME'   NAME OF THE CSECT
   000064 00000000                      2174  1 ASADSCSA DC     A(0)            RELATIVE LOAD ADDRESS THEREOF
   000068 00000000                      2175  1 ASADSASA DC     A(0)            ADDRESS OF THE FIRST A-BLOCK
   00006C 00                            2176  1 ASADSIND DC     XL1'00'         INDICATOR ISD/LSD INFORMATION AVAIL
                                        2177  1 *
                  000004                2178  1 ASADSISD EQU    X'04'           - MEANING ISD INFORMATION IS AVAIL
                  000008                2179  1 ASADSLSD EQU    X'08'           - MEANING LSD INFORMATION IS AVAIL
   000070 00000000                      2180  1 ASADSPL  DC     A(0)            PROGRAMM-LAENGE
   000074 00000000                      2181  1 ASADSLL  DC     A(0)            LADEMODUL-LAENGE
   000078 00000000                      2182  1 ASADSSL  DC     A(0)            SOURCE-MODUL-LAENGE
   00007C 00000000                      2183  1 ASADSOL  DC     A(0)            OBJEKTMODUL-LAENGE
   000080 00000000                      2184  1 ASADSCL  DC     A(0)            CSECT-LAENGE
                  00002C                2185  1          ORG    ASADSXXX


                                        2186  1 ********************************************************************************
                                        2187  1 *                                                                              *
                                        2188  1 *        SUBFUNKTION:  LIEFERE MAP - INFORMATION                               *
                                        2189  1 *                                                                              *
                                        2190  1 ********************************************************************************
   00002C 00000000                      2191  1 ASADSAUB DC     A(0)            START ADDRESS OF BUFFER AREA
   000030 0000                          2192  1 ASADSLUB DC     Y(0)            LENGTH OF BUFFER AREA
                  000034                2193  1 ASADSXLV EQU    ASADSLEV        LEVEL OF THE ITEM: I. E.
                  000004                2194  1 ASADSXLM EQU    ASADSLLM        LOAD MODULE LEVEL
                  000008                2195  1 ASADSXSM EQU    ASADSLSM        SOURCE MODULE LEVEL
                  00000C                2196  1 ASADSXOM EQU    ASADSLOM        OBJECT MODULE LEVEL
                  000010                2197  1 ASADSXCS EQU    ASADSLCS        CSECT LEVEL


                                        2198  1 *               THE FOLLOWING EQUATES DESCRIBE THE STRUCTURE OF
                                        2199  1 *               ONE RECORD RETURNED IN THE BUFFER
                                        2200  1 *               !!!! THIS EQUS MUST CORRESPOND TO LENGTH !!!!
                                        2201  1 *               !!!! OF FIELDS DESCRIBED WITHIN 'ARBBLK' !!!!
                                        2202  1 *               !!!! DSECT DEFINED IN MODULE AIDSYS05.   !!!!
                                        2203  1 *
                  000000                2204  1 ASADSBNM EQU    X'00'           OFFSET:NAME OF CSECT/LOADMODULE/
                                        2205  1 *                               OBJECTMODULE
                  000008                2206  1 ASADSBAD EQU    X'08'           OFFSET:A(ADDRESS OF OBJECT)
                  00000C                2207  1 ASADSBLN EQU    X'0C'           OFFSET:A(LENGTH OF OBJECT)
                  000010                2208  1 ASADSETP EQU    X'10'           OFFSET FUER 13-BYTE-ETPND
                  000020                2209  1 ASADSBL  EQU    X'20'           OFFSET:LENGTH(RECORD)
                  000084                2210  1          ORG
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        2211  1 ************************************************************************
                                        2212  1 **              ALLGEMEINE WEITERE RUECKKEHR - PARAMETER              **
                                        2213  1 ************************************************************************
000084 00                               2214  1 ASADSFBR DC    X'00'       ALL: ANZEIGENFELD
                          000004        2215  1 ASADSQUL EQU   ASAUQUAL        UEBERQUALIFIZIERTE EINGABE
                          000008        2216  1 ASADSMOR EQU   X'08'           BUFFER OVERFLOW; FURTHER CALL NECESS
                          000059        2217  1 ASADSLEN EQU   *-ASADSXXX      LENGTH OF SUBFUNCTION PARAMETERS



                                        2218  1 ************************************************************************
                                        2219  1 **                                                                    **
                                        2220  1 **                    G E T   A D D R E S S                           **
                                        2221  1 **                    ---------------------                           **
                                        2222  1 **  ZUGRIFF AUF DIE 'EOLDTAB'. LIEFERT ZU VORGEGEBENER VIRUELLER     **
                                        2223  1 **  ADRESSE EINEN MODULNAMEN UND EINE MODULRELATIVE ADRESSE.          **
                                        2224  1 **  LIEFERT BEI VORGEGEBENEM MODULNAMEN DIE ZUGEHOERIGE MODUL-       **
                                        2225  1 **  ANFANGSADRESSE.                                                   **
                                        2226  1 **                                                                    **
                                        2227  1 ************************************************************************
                          000014        2228  1          ORG   ASALABEL

                                        2229  1 ************************************************************************
                                        2230  1 **              HEADER - PARAMETER                                    **
                                        2231  1 ************************************************************************
                          000050        2232  1 ASAGA     EQU   X'50'       ALL: FUNCTION = GET ADDRESS
                          000000        2233  1 ASAGAEO   EQU   X'00'       EO:  SUBFCT   = ACCESS EOLDTAB BY NAME
                          000004        2234  1 ASAGAEOA  EQU   X'04'       EOA: SUBFCT   = ACCESS EOLDTAB BY ADDRESS
                          000004        2235  1 ASAGAMAX  EQU   X'04'            MAX# OF SUBFUNCTION

                                        2236  1 ************************************************************************
                                        2237  1 **              AUFRUF - PARAMETER                                    **
                                        2238  1 ************************************************************************
000014 00000000                         2239  1 ASAGAADD DC    A(0)        EOA: ADDRESS FOR SEARCH IN EOLDTAB
                          000014        2240  1          ORG   ASAGAADD
000014 E2E8D4C2D6D34040                 2241  1 ASAGANME DC    CL8'SYMBOL' EO:  SYMBOLIC NAME; MUST BE FILLED UP
                                        2242  1 *                           WITH BLANKS IF LESS THAN 8 CHARS.
00001C 00                               2243  1 ASAGAFIL DC    X'00'       ALL: LINKNAME OF DUMPFILE
00001D 00                               2244  1 ASAGAFB  DC    X'00'       ALL: INDICATOR
                          000010        2245  1 ASAGAFEF EQU   ASADUMP     ALL: ACCESS DUMPFILE



                                        2246  1 ************************************************************************
                                        2247  1 **              RUECKKEHR - PARAMETER                                 **
                                        2248  1 ************************************************************************
                          000013        2249  1 ASAGARTN EQU   ASARETRN     ALL: RETURN CODE
                          000000        2250  1 ASAGAOK  EQU   X'00'       ALL: REQUEST HONOURED
                          000004        2251  1 ASAGAFE  EQU   X'04'       ALL: FORMALER FEHLER
                                        2252  1 *                                - UNGUELTIGE SUBFUNKTION
                                        2253  1 *                                - UNGUELTIGE DUMPFILE LINK#
                                        2254  1 *                                - EO: KEIN NAME ANGEGEBEN
                          000008        2255  1 ASAGANOE EQU   X'08'       ALL: EOLDTAB NOT FOUND
                          00000C        2256  1 ASAGAFNO EQU   X'0C'       ALL: SPECIFIED FILE NOT OPEN
                          000010        2257  1 ASAGANNF EQU   X'10'       EO:  SPECIFIED NAME NOT FOUND
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                          000014          2258  1 ASAGAANF EQU   X'14'        EOA: NO MODULE FOUND FOR SPECIFIED LOCATION

    000020                                2259  1 ASAGAXXX DS    0F
    000020 00000000                       2260  1 ASAGAADR DC    A(0)         EO:  ADDRESS OF SPECIFIED SYMBOL
                                          2261  1 *                           EOA: RELATIVE ADDRESS OF SPECIFIED
                                          2262  1 *                                LOCATION WITHIN CSECT
    000024 C3E2C5C3E3404040               2263  1 ASAGAMOD DC    CL8'CSECT'   EOA: NAME OF CSECT THAT CONTAINS
                                          2264  1 *                                SPECIFIED LOCATION
    00002C 00000000                       2265  1 ASAGAENT DC    A(0)         ALL: POINTER TO ENTRY IN EOLDTAB
                          000010          2266  1 ASAGALEN EQU   *-ASAGAXXX        LENGTH(RETURN-PARAMS)



                                          2267  1 ********************************************************************
                                          2268  1 **                                                                **
                                          2269  1 **                    I N F O R M                                 **
                                          2270  1 **                    -----------                                 **
                                          2271  1 **  DIESER SERVICE LIEFERT VERSCHIEDENE TASK- ODER SYSTEM-BEZOGENE  **
                                          2272  1 **  INFORMATIONEN:                                                **
                                          2273  1 **     - ALLE FILE CONTROL BLOCKS EINES TASKS                     **
                                          2274  1 **     - ALLE PROCESS CONTROL BLOCKS EINES TASKS                  **
                                          2275  1 **     - ALLE TESTPUNKTE (TASK OR SYSTEM) DES ANGEGEBENEN TASKS   **
                                          2276  1 **     - ALLE AID/IDA-REPS                                        **
                                          2277  1 **     - ALLE TASKS ON DUMPDATEI                                  **
                                          2278  1 **                                                                **
                                          2279  1 ********************************************************************
                          000014          2280  1          ORG   ASALABEL

                                          2281  1 ********************************************************************
                                          2282  1 **                 HEADER - PARAMETER                             **
                                          2283  1 ********************************************************************
                          000054          2284  1 ASAI2     EQU   X'54'        ALL: FUNCTION = INFORM
                          000000          2285  1 ASAI2FCB  EQU   X'00'        FCB: SUBFUNCTION = GET ALL FCB'S
                          000004          2286  1 ASAI2PCB  EQU   X'04'        PCB: SUBFUNCTION = GET ALL PCB'S
                          000008          2287  1 ASAI2OSC  EQU   X'08'             UNUSED
                          00000C          2288  1 ASAI2TPT  EQU   X'0C'        TPT: SUBFUNCTION = GET ALL TESTPOINTS
                          000010          2289  1 ASAI2MVE  EQU   X'10'        MVE: SUBFUNCTION = GET ALL SYSTEM-MOVES
                          000014          2290  1 ASAI2DMP  EQU   X'14'        DMP: SUBFUNKTION = ALLE TASKS VON DUMPDATEI
                          000014          2291  1 ASAI2MAX  EQU   X'14'             MAXIMUM # OF SUBFUNCTION

                                          2292  1 ********************************************************************
                                          2293  1 **                 AUFRUF - PARAMETER                             **
                                          2294  1 ********************************************************************
    000014 0000                           2295  1 ASAI2ITN  DC    H'0'         ALL: ITN; X'0000' BEDEUTET DEFAULT-TASK
    000018 00000000                       2296  1 ASAI2TSN  DC    A(0)         ALL: TSN; A(0) BEDEUTET DEN DEFAULT-TASK
    00001C 00000000                       2297  1 ASAI2ADR  DC    A(0)         ALL: A(BUFFER), INTO WHICH AIDSYS HAS TO
                                          2298  1 *                                RETURN THE REQUESTED INFORMATION. THE
                                          2299  1 *                                END OF THE LIST WILL BE MARKED BY
                                          2300  1 *                                AIDSYS WITH C'********'.
    000020 00000000                       2301  1 ASAI2BLN  DC    A(0)         ALL: LENGTH OF BUFFER SPECIFIED BY ASAI2ADR

    000024 00                             2302  1 ASAI2FB   DC    X'00'        ALL: FLAGBYTE
                          000010          2303  1 ASAI2DT   EQU   ASADUMP      ALL: ACCESS DUMPED TASK
                          000040          2304  1 ASAI2SYS  EQU   X'40'        TPT: FOR SUBFCT ASAI2TPT ONLY: GET TEST-
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        2305  1 *                                   POINTS SET IN SYSTEM'S SPACE BY
                                        2306  1 *                                   SPECIFIED TASK
                          000020        2307  1 ASAI2ALS EQU   X'20'        TPT:   FOR SUBFCT ASAI2TPT ONLY; GET ALL
                                        2308  1 *                                   TESTPOINTS IN SYSTEM WITHOUT REGARD
                                        2309  1 *                                   TO ANY SPECIFIC TASK
                          000000        2310  1 ASAI2VIT EQU   ASAITN              NICHT VERWENDET
                          000000        2311  1 ASAI2VTS EQU   ASATSN              NICHT VERWENDET

  000025 00                             2312  1 ASAI2LNK DC    X'00'         ALL:   LINK# OF DUMPFILE (OPTIONAL)
  000026 4040404040404040               2313  1 ASAI2MOD DC    CL8' '    CSC/TPT:   MODULE-NAME


                                        2314  1 ********************************************************************************
                                        2315  1 **                  RUECKKEHR - PARAMETER                                 **
                                        2316  1 ********************************************************************************
                          000013        2317  1 ASAI2RTN EQU   ASARETRN             RETURN- CODE
                          000000        2318  1 ASAI2OK  EQU   X'00'         ALL:   ALL OK
                          000004        2319  1 ASAI2FE  EQU   X'04'         ALL:   FORMALER FEHLER:
                                        2320  1 *                                   - DER AUFRUFER IST NICHT 'AID'
                                        2321  1 *                                   - UNGUELTIGE SUBFUNKTION
                                        2322  1 *                                   - ITN > 255
                          000008        2323  1 ASAI2NMA EQU   X'08'         ALL:   NO BUFFER SPECIFIED
                          00000C        2324  1 ASAI2ILK EQU   X'0C'         ALL:   INVALID DUMPFILE-LINK
                          000010        2325  1 ASAI2FNO EQU   X'10'         ALL:   DUMPFILE NOT OPEN
                          000014        2326  1 ASAI2INS EQU   X'14'         ALL:   NO TASK SPECIFIED
                          000018        2327  1 ASAI2INF EQU   X'18'         ALL:   SPECIFIED ITN/TSN NOT FOUND
                          00001C        2328  1 ASAI2NAC EQU   X'1C'         ALL:   SPECIFIED TASK CANNOT BE ACCESSED
                          000020        2329  1 ASAI2FNI EQU   X'20'         TPT:   FUNCTION NOT YET IMPLEMENTED
                          000024        2330  1 ASAI2NFS EQU   X'24'         ALL:   NO FILE SPECIFIED
                          000028        2331  1 ASAI2BNA EQU   X'28'         ALL:   BUFFER NOT WRITE-ACCESSABLE
                          00002C        2332  1 ASAI2NAV EQU   X'2C'         MVE:   CONCISE REP AREA IST NICHT VORHANDEN
                                        2333  1 *                                   ODER MOMENTAN GESPERRT

  00002E                                2334  1 ASAI2XXX DS    0X
  00002E 00                             2335  1 ASAI2RFB DC    X'00'         ALL:   FLAG-BYTE
                          000080        2336  1 ASAI2NCP EQU   X'80'         ALL:   INFORMATION IS NOT COMPLETE BECAUSE
                                        2337  1 *                                   OF LACK OF MEMORY
                          000004        2338  1 ASAI2QUL EQU   ASAUQUAL             UEBERQUALIFIZIERTE EINGABE
                          000001        2339  1 ASAI2LEN EQU   *-ASAI2XXX          LENGTH OF RETURN-PARAMS


                                        2340  1 ********************************************************************************
                                        2341  1 **              ES FOLGEN DIE PUFFER-FORMATE DER RECORDS                  **
                                        2342  1 ********************************************************************************
                                        2343  1 ********************************************************************************
                                        2344  1 **        SUBFCT = ALL PCBS                                               **
                                        2345  1 ********************************************************************************
                          000000        2346  1 ASAI2PAD EQU   X'00'             OFFSET FOR A(PCB)
                          000004        2347  1 ASAI2PC  EQU   X'04'             OFFSET FOR P-COUNTER; ERSTES FELD DES
                                        2348  1 *                                   BEFEHLSZAEHLERS ENTHAELT DAS BYTE
                                        2349  1 *                                   'ESTKIND', MIT DER SYSTEM-EXIT-ANZEIGE
                          000008        2350  1 ASAI2ISR EQU   X'08'             OFFSET FOR ISR
                          00000C        2351  1 ASAI2PLN EQU   X'0C'             LENGTH OF RECORD
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                 2352  1 ********************************************************************************
                                 2353  1 *            SUBFCT = ALL FCBS                                                 **
                                 2354  1 **           8 BYTES LINKNAME                                                  **
                                 2355  1 **           1 BYTE  OPEN-INDICATOR                                            **
                                 2356  1 ********************************************************************************
000080                           2357  1 ASAI2FOP EQU   X'80'            FILE IS OPEN
000009                           2358  1 ASAI2FL  EQU   X'09'            LENGTH OF RECORD


                                 2359  1 ********************************************************************************
                                 2360  1 **             SUBFCT = TPOINT                                                 **
                                 2361  1 ********************************************************************************
000000                           2362  1 ASAI2TLC EQU   X'00'            OFFSET OF LOCATION OF TESTPOINT
                                 2363  1 *                               CONTENTS = C'***T' THEN THIS IS TRACE
                                 2364  1 *                                        = C'***1' : EVENT-1-INFO
                                 2365  1 *                               UNTIL    = C'***7' : EVENT-7-INFO
000004                           2366  1 ASAI2TAL EQU   X'04'            OFFSET OF A(ACTIONLIST)
000008                           2367  1 ASAI2TLN EQU   X'08'            LENGTH OF RECORD


                                 2368  1 ********************************************************************************
                                 2369  1 **             SUBFCT = SYSTEM-MOVES                                           **
                                 2370  1 ********************************************************************************
000000                           2371  1 ASAI2SAD EQU   0                 OFFSET FOR ADDRESS OF 1ST OVERWRITTEN
                                 2372  1 *                               BYTE
000004                           2373  1 ASAI2SL  EQU   4                 OFFSET FOR LENGTH OF MOVE
000005                           2374  1 ASAI2SLN EQU   5                 LENGTH OF RECORD


                                 2375  1 ********************************************************************************
                                 2376  1 **              SUBFUNKTION: ALLE TASKS VON DUMPDATEI                          **
                                 2377  1 ********************************************************************************
000000                           2378  1 ASAI2DI  EQU   X'00'            OFFSET FUER ITN
000002                           2379  1 ASAI2DTS EQU   X'02'            OFFSET FUER TSN
000006                           2380  1 ASAI2DAT EQU   X'06'            OFFSET FUER TCB-ADRESSE
00000A                           2381  1 ASAI2DLN EQU   X'0A'            LAENGE EINES PUFFER-EINTRAGS



                                 2382  1 ********************************************************************************
                                 2383  1 **                                                                            **
                                 2384  1 **             AENDERN AKTIONSLISTEN-ZEIGER                                   **
                                 2385  1 **             ----------------------------                                   **
                                 2386  1 **                                                                            **
                                 2387  1 ********************************************************************************
000014                           2388  1          ORG   ASALABEL

                                 2389  1 ********************************************************************************
                                 2390  1 **             HEADER - PARAMETER                                             **
                                 2391  1 ********************************************************************************
000058                           2392  1 ASAPT     EQU   X'58'       ALL: FUNKTION = AENDERN AKTIONSLISTEN-
                                 2393  1 *                                  ZEIGER
000000                           2394  1 ASAPTTPT EQU   X'00'         TPT: SUBFCT   = TESTFUNKTZEIGER
000004                           2395  1 ASAPTEVT EQU   X'04'         EVT: SUBFCT   = EREIGNIS- ODER MASCHINEN-
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        2396  1 *                                        TRACE-ZEIGER
                          000008        2397  1 ASAPTTRC EQU   X'08'       TRC: SUBFCT   = STATEMENTTRACEZEIGER
                          000008        2398  1 ASAPTMAX EQU   X'08'            MAX. # EINER SUBFUNKTION

                                        2399  1 ********************************************************************************
                                        2400  1 **              AUFRUF - PARAMETER                                            **
                                        2401  1 ********************************************************************************
000014 00000000                         2402  1 ASAPTADR DC    A(0)         ALL: ADRESSE DER NEUEN AKTIONSLISTE
000018 00000000                         2403  1 ASAPTTAD DC    A(0)         TPT: ADRESSE DES BETROFFENEN TESTPUNKTS
                          000018        2404  1          ORG   ASAPTTAD
000018 00                               2405  1 ASAPTECL DC    X'00'        EVT: BETROFFENE EREIGNISKLASSE. SIND MEHR
                                        2406  1 *                                  ALS EINE EREIGNISKLASSE ANGEGEBEN,
                                        2407  1 *                                  SO WIRD FUER ALLE KLASSEN DIE SELBE
                                        2408  1 *                                  AKTIONSLISTENADRESSE GESETZT.


                                        2409  1 ********************************************************************************
                                        2410  1 **              RUECKKEHR - PARAMETER                                         **
                                        2411  1 ********************************************************************************
                          000019        2412  1 ASAPTXXX EQU   *                  ANFANG RUECKKEHRPARAMETER
                          000013        2413  1 ASAPTRTN EQU   ASARETRN           RUECKKEHRCODE
                          000000        2414  1 ASAPTOK  EQU   X'00'              FUNKTION AUSGEFUEHRT. ASAPTRAD
                                        2415  1 *                                  ENTHAELT ZUR KONTROLLE DIE ALTE
                                        2416  1 *                                  ERSETZTE AKTIONSLISTENADRESSE
                          000004        2417  1 ASAPTFE  EQU   X'04'              FORMALER FEHLER, D.H. ENTWEDER:
                                        2418  1 *                                  - AUFRUFER IST NICHT AID
                                        2419  1 *                                  - UNGUELTIGE UNTERFUNKTIONSNUMMER
                                        2420  1 *                                  - ASAPTADR NICHT DEFINIERT
                                        2421  1 *                                  - KEINE EREIGNISKLASSE DEFINIERT
                                        2422  1 *                                  - UNGUELTIGE EREIGNISKLASSE DEF.
                          000008        2423  1 ASAPTERR EQU   X'08'              FUER DIE ANGEGEBENE UNTERFUNKTION
                                        2424  1 *                                  EXISTIERT KEIN AKTIVER EINTRAG.
                                        2425  1 *                                  AKTION WURDE NICHT AUSGEFUEHRT
00001C 00000000                         2426  1 ASAPTRAD DC    A(0)               ERSETZTE AKTIONSLISTENADRESSE ZUR
                                        2427  1 *                                  KONTROLLE. FALLS X'00000000' ZURUECK-
                                        2428  1 *                                  GEGEBEN WIRD, DER RETURNCODE ABER
                                        2429  1 *                                  X'00' IST, BEDEUTET DIES, DASS MEHR
                                        2430  1 *                                  ALS EIN ALTER ZEIGER ERSETZT WURDE,
                                        2431  1 *                                  ABER NICHT ALLE IDENTISCHE WAREN.
                                        2432  1 *                                  MOEGLICHERWEISE LIEGT EIN AID-
                                        2433  1 *                                  FEHLER VOR.
                          000007        2434  1 ASAPTLEN EQU   *-ASAPTXXX         LAENGE DER RUECKKEHRPARAMETER
                          000085        2435  1          ORG
                          000085        2436  1 ASALENGT EQU   *-ASASERVE         LENGTH(ASERP)


                          0000A0        2437  1 ASATTLEN EQU   ((ASALENGT+X'1F')/32)*32 LEN(AIDSYS=TRACETABLE-ENTRY)
                          000058        2438  1 ASASBMAX EQU   X'58'              MAX. # OF SUBFUNCTION
                          000038        2439  1 ASAAID2  EQU   X'38'              MAX. # OF SUBFCT IN AIDSYS02
                          000040        2440  1 ASAAID3  EQU   X'40'              MAX. # OF SUBFCT IN AIDSYS03
                          000060        2441  1 ASAAID4  EQU   X'60'              MAX. # OF FCT IN AIDSYS04
                          000050        2442  1 ASAAID5  EQU   X'50'              MAX. # OF FCT IN AIDSYS05
```

I have given this program in order to show different things :

1) In a more or less complex modules, you have many entries what is not easy to handle because if you have an entry, you must have an external in the other module . There is of course a problem if you want to modify the description of SYSBASE, for example, which is defined here in this module, the changes must be seen by all other modules that use it . It is not easy to see what are the calling modules (here, in fact, it is not a problem because the calling modules are written in the beginning of the module, but sometimes it is not possible to do it so).

2) See page 102, the comments. Is it not so wonderfull when dealing with modules ? It is of course not a criticism but only example of what we sometimes must handle .

3) See page 103, the comments . Is it not absurd that some modules presupposes that he receive the correct value in the register . In the called module, there are no saving attitude nor testing to see if no error .

4) There is also a problem because sometimes the decision if an error has occured in the called module, it is in the called module that it is decided if it returns normally or if it returns to the next instruction which is a branch to the error routine. This is of course not normal because the programmer has then to know what are done in both module and not only in his own module .

5) I have putted after the program its flowchart, it is not the best solution, but it seems to me that if the flowchart is simple and therefore easy to understand, than the program is easy also . Indeed, in order to do this flowchart so "in one lime", I have had to rewritte various times the logic of the program and therefore, I was able to keep it simple and is it not right that simple is beautifull ?

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        3910    ********************************************************************************* 02270000
                                        3911    *                                                                               * 02271000
                                        3912    *        THE ENTRIES ARE:                                                       * 02272000
                                        3913    *                                                                               * 02274000
                                        3914    ********************************************************************************* 02275000


    000458                              3915            ENTRY SYSBASE       BOTH THIS ENTRIES HAVE A VALUE GIVEN      02276000
    000460                              3916            ENTRY EXVTBASE      BY THE CALLER.                            02277000
    00045C                              3917            ENTRY AREADRT       ADDRESS OF CALLER READ ROUTINE            02278000
    0004AC                              3918            ENTRY SAVE3         SAVEAREA ZONE FOR AS4RDPGE                02278500
    0004F4                              3919            ENTRY SAVEREG8      SAVEAREA FOR REGISTER 08                  02278700
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

    000000                           3920    DPACCESS CSECT                                                          02289000
    000000 90 EC D00C                3921             STM   R#14,R#12,12(R#13)                                   02309000
    000004 05 C0                     3922             BALR  R#12,0                                                02319000
    000006                           3923             USING *,R#12                                                02329000
    000006 50 D0 C462      000468    3924             ST    R#13,SAVE+4     SAVE THE ADDRESS OF THE CALLER SAVE AREA 02339000
    00000A 41 D0 C45E      000464    3925             LA    R#13,SAVE       LOAD THE ADDRESS OF THE NEW SAVE AREA    02349000
    00000E 18 81                     3926             LR    R#08,R#01       USING OF DSECT BECAUSE OF MACRO          02359000
    000010 50 80 C4EE      0004F4    3927             ST    R#08,SAVEREG8   SAVE REGISTER 8 COULD BE DESTROYED !    02364000
    000000                           3928             USING MALIB,R#08      USE R#08 AS BASE REGISTER FOR THE DSECT  02369000


    000014 D2 03 C4568008 00045C 000008 3929          MVC   AREADRT,DPAREAD MOVE A(READ-ROUTINE) TO EXTERNAL FIELD   02375000

                                     3930    ************************************************************************* 02389000
                                     3931    *                                                                       * 02399000
                                     3932    *        THE FIRST TEST DONE HERE ARE VALIDATION OF SUBFUNCTION         * 02409000
                                     3933    *        NUMBER.                                                        * 02419000
                                     3934    *                                                                       * 02439000
                                     3935    ************************************************************************* 02449000

    00001A 91 F3 8000      000000    3936             TM    DPAFCT,DPAVALFN  X'F3' IS EQUATE OF B'11110011'          02469000
                                     3937    *                               WICH IS THE MASK TO VALIDATE             02479000
                                     3938    *                               THE NUMBER'S SUBFUNCTION.                02489000
    00001E 47 70 C41C      000422    3939             BNZ   RTNISFN                                                  02499000


    000022 95 08 8000      000000    3940             CLI   DPAFCT,DPAMAXNF THIS TEST IS DONE IN ORDER TO AVOID THE    02510000
                                     3941    *                               X'0C' VALUE WHICH IS NO MORE VALID.      02520000
    000026 47 20 C41C      000422    3942             BH    RTNISFN         DPAMAXNF CONTAINS THE MAXIMUM VALID      02530000
                                     3943    *                               NUMBER FOR A KNOWN FUNCTION.             02540000


                                     3944    ************************************************************************* 02729000
                                     3945    *                                                                       * 02739000
                                     3946    *        THE NEXT TESTS ARE DONE IN ORDER TO VALIDATE THE DIFFERENT     * 02744000
                                     3947    *        ADDRESSES TO BE PROVIDED BY THE CALLER.                        * 02749000
                                     3948    *                                                                       * 02759000
                                     3949    ************************************************************************* 02769000


                                     3950    *        CLC   DPAATCB,=A(0)   THIS COMPARE IS DONE IN ORDER TO SEE     02799000
                                     3951    *                              IF AN TCB ADDRESS WAS GIVEN              02889000
                                     3952    *         BE    RTNFF          IF NOT,BRANCH TO FORMAL FEHLER           02889400
                                     3953    *                                                                       02889800
                                     3954    *                                                                       02890200
                                     3955    *                                                                       02890600
                                     3956    *         TM    DPAATCB+3,DPAVALFW  COMPARE THE TWO RIGHTEST BITS        02891000
                                     3957    *                                   IF THE RESULT CONTAINS SOME          02891400
                                     3958    *                                   ONES,THEN THE ADDRESS IS NOT         02891900
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        3959    *                          FULL WORD ALIGNED.                    02892300
                                        3960    *          BNZ   RTNNWA    BRANCH TO NOT WORD ALIGNED.           02892700

 00002A D5 03 8010C42A 000010 000430    3961               CLC   DPASYSBS,=A(0) SYSBASE ADDRESS GIVEN ?            02893500
 000030 47 80 C15A     000160           3962               BE    RTNFF           NO,BRANCH TO FORMAL FEHLER          02893900

 000034 91 03 8013     000013           3963               TM    DPASYSBS+3,DPAVALFW FW ALIGNED ADDRESS ?            02894800
 000038 47 70 C162     000168           3964               BNZ   RTNNWA              NO,BRANCH TO FORMAL FEHLER.     02895200

 00003C D5 03 8014C42A 000014 000430    3965               CLC   DPAAXVT,=A(0)  TEST IF XVT ADDRESS IS GHIVEN ?    02896000
 000042 47 80 C15A     000160           3966               BE    RTNFF           NO,BRANCSH TO FORMAL FEHLER.        02896400

 000046 91 03 8017     000017           3967               TM    DPAAXVT+3,DPAVALFW FW ADDRESS ALIGNED ?             02897300
 00004A 47 70 C162     000168           3968               BNZ   RTNNWA              NO,BRANCH TO NOT WORD ALIGNED  02897700
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        3969    ********************************************************************** 02898500
                                        3970    *                                                                    * 02899000
                                        3971    *       WHAT IS DONE HERE IS TO SEE IF WHE A(READ) IS NOT GIVEN      * 02909000
                                        3972    *       (OR EQUATE TO 0),THEN A VALID LINK NUMBER TO THE DUMPFILE    * 02919000
                                        3973    *       HAS TO BE GIVEN.IF THE A(READ) IS GIVEN (NOT EQUATES 0),     * 02921000
                                        3974    *       THEN A VALID ITN HAS TO BE GIVEN                             * 02924000
                                        3975    *       IN THE SAME TIME VALIDATIONS ARE ALSO DONE.                  * 02926000
                                        3976    *                                                                    * 02929000
                                        3977    ********************************************************************** 02939000

00004E D5 03 8008C42A 000008 000430     3978            CLC   DPAREAD,=A(0)    IS THE READ ADDRESS  GIVEN ?            02959000
000054 47 70 C068     00006E            3979            BNE   READGIVN         YES,BRANCH TO READ GIVEN                02969000

000058 D5 03 8004C42E 000004 000434     3980            CLC   DPALINK,=F'0'    IS A LINK NUMBER GIVEN ?                02979000
00005E 47 80 C15A     000160            3981            BE    RTNFF            YES,BRANCH TO FORMAL FEHLER             02989000

000062 95 07 8004     000004            3982            CLI   DPALINK,DPALINK# IS THAT A VALID LINK NUMBER ?          02999000
000066 47 20 C182     000188            3983            BH    RTNILN           NO,BRANCH TO INVALID LINK NUMBER        03009000

00006A 47 F0 C096     00009C            3984            B     VALIDPRM         YES,BRANCH TO VALIDATION O.K.           03019000

00006E                                  3985    READGIVN DS   0Y               WE ARE HERE ONLY IF A(READ) IS <> 0     03020200
00006E D5 03 801CC42E 00001C 000434     3986            CLC   DPAITN,=F'0'     ITN GIVEN ?                             03020800
000074 47 80 C192     000198            3987            BE    RTNRNI           NO,BRANCH TO A(READ) GIVEN BUT NO ITN.  03021500

000078 D5 03 800CC42A 00000C 000430     3988            CLC   DPAATCB,=A(0)    IS AN TCB GIVEN ?                       03021560
00007E 47 80 C15A     000160            3989            BE    RTNFF            NO,BRANCH FORMAL FEHLER                 03021590

000082 91 03 800F     00000F            3990            TM    DPAATCB+3,DPAVALFW COMPARE THE TWO RIGHTEST BITS IF      03021660
                                        3991    *                                NOT ZEROES, THEN BRANCH TO NOT WORD     03021690
                                        3992    *                                ALIGNED                                 03021730
000086 47 70 C162     000168            3993            BNZ   RTNNWA             NO,BRANCH TO NOT WORD ALIGNED           03021760

00008A 91 03 800B     00000B            3994            TM    DPAREAD+3,DPAVALFW IS THE READ ADDRESS FW ALIGNED ?     03022100
00008E 47 70 C162     000168            3995            BNZ   RTNNWA           NO,BRANCH TO NOT WORD ALIGNED           03022700
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000092 D5 02 801CC42E 00001C 000434  3996           CLC   DPAITN(DPAITNL),=F'0' VALID ITN GIVEN ?                  03023300
    000098 47 70 C15A     000160         3997           BNE   RTNFF             NO,BRANCH TO FORMAL FEHLER              03024000



    00009C                               3998   VALIDPRM DS    0Y                VALID PARAMETER                         03025200
    00009C D2 03 C4528010 000458 000010  3999           MVC   SYSBASE,DPASYSBS  MOVE THE VALUE OF SYSBASE FOR THE       03025800
                                         4000   *                               ENTRY TO BE CORRECT                     03026500
    00QOA2 D2 03 C45A8014 000460 000014  4001           MVC   EXVTBASE,DPAAXVT  MOVE THE VALUE OF XVT FOR THE ENTRY     03027100
                                         4002   *                               TO BE CORRECT                           03027700
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4003    ********************************************************************** 03039000
                                        4004    *                                                                    * 03049000
                                        4005    *       THE DONE AFTER ARE VALIDATION OF IND,                        * 03059000
                                        4006    *       VALIDATION OF BUFFER ADDRESS AND BUFFER LENGTH               * 03069000
                                        4007    *       VALIDATION OF FLAGUSER AND LAST VALIDATION OF FUNCTION       * 03079000
                                        4008    *                                                                    * 03089000
                                        4009    ********************************************************************** 03099000

0000A8 95 04 801B      00001B           4010            CLI   DPAIND+DPAINDL,ASAOTCUS TEST IF THE DUMPFILE TYPE       03119000
                                        4011    *                             IS A USER DUMPFILE                     03124000
0000AC 47 80 C0BA      0000C0           4012            BE    VALIDDFT        YES,NO MORE TEST NEEDED IT IS O.K.     03129000

0000B0 95 02 801B      00001B           4013            CLI   DPAIND+DPAINDL,ASAOTCSY TEST IF THE DUMPFILE TYPE       03139000
                                        4014    *                             IS A SYSTEM DUMPFILE                   03144000
0000B4 47 80 C0BA      0000C0           4015            BE    VALIDDFT        YES,NO MORE TEST NEEDED IT IS O.K.     03149000

0000B8 95 08 801B      00001B           4016            CLI   DPAIND+DPAINDL,ASAOTSLD TEST IF THE DUMPFILE TYPE IS     03150000
                                        4017    *                             IS A SLED FILE                         03151000
0000BC 47 70 C18A      000190           4018            BNE   RTNIIND         NO,THEN THERE IS AN ERROR BECAUSE      03152000
                                        4019    *                             IT IS THE NEITHER A USER DUMP NOR A    03153000
                                        4020    *                             SYSTEM DUMP NOR A SLED AND NOTHING     03155000
                                        4021    *                             ELSE IS KNOWN.                         03157000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4022    ********************************************************************************** 03157200
                                         4023    *                                                                                * 03157300
                                         4024    *        THE NEXT TESTS ARE DONE IN ORDER TO SEE IF THAT IS THE FIRST            * 03157500
                                         4025    *        CALL OR A SUCESSIVE ONE,IF BOTH SYSTEM AND USER SPACE IS                * 03157600
                                         4026    *        WANTED.                                                                 * 03157700
                                         4027    *                                                                                * 03157800
                                         4028    ********************************************************************************** 03157860



    0000C0                               4029    VALIDDFT DS    0Y                                                                03158000
    0000C0 91 DF 8028      000028        4030             TM    DPAFLAG,DPAUSSET SEE IF USER FLAG IS SET OR OMITTED             03159000
    0000C4 47 70 C0CA      0000D0        4031             BNZ   GIVEN            IF OMITTED DEFAULT IS TO BE SET                 03169000


    0000C8 96 08 8028      000028        4032             OI    DPAFLAG,DPASYST  DEFAULT SET                                     03179000
    0000CC 47 F0 C0E6      0000EC        4033             B     ONESET           NO CHECK IF FLAG CORRECTLY SET,THE              03181000
                                         4034    *                               PROGRAM ONLY PROVIDE CORRECT VALUE...           03184000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4035    ********************************************************************** 03186100
                                        4036    *                                                                    * 03186300
                                        4037    *       IF WE ARE HERE THEN WE ARE SURE THAT THE CALLER HAS GIVEN    * 03186500
                                        4038    *       A VALUE TO DPAFLAG,BUT WE ARE NOT SURE THAT IT IS A CORRECT  * 03186700
                                        4039    *       VALUE IN IT.THEN WE TEST IT HERE.                            * 03186900
                                        4040    *                                                                    * 03187100
                                        4041    ********************************************************************** 03187300


0000D0                                  4042    GIVEN    DS   0Y                                                      03189000

0000D0 91 D3 8028     000028            4043             TM   DPAFLAG,DPAVALFL  TEST IF VALIDE VALUE OF THIS FLAG      03209000
                                        4044    *                              THE MASK VALUE IS X'D3' OR B'11010011'  03219000
0000D4 47 70 C15A     000160            4045             BNZ  RTNFF             IF NOT 0,THEN BRANCH TO FORMAL FEHLER   03229000


0000D8 95 2C 8028     000028            4046             CLI  DPAFLAG,DPAFLAGM TEST IF FLAG HAS A VALUE <= 2C         03249000
0000DC 47 20 C15A     000160            4047             BH   RTNFF            IF NOT <= 44,THEN BRANCH TO FORMAL FEHL. 03259000


0000E0 91 0C 8028     000028            4048             TM    DPAFLAG,DPAALL  TEST IF BOTH USER AND SYSTEM ARE SET    03279000
0000E4 47 E0 C0E6     0000EC            4049             BNO   GNESET          IF NOT DOES NOT MATTER                   03289000


0000E8 92 40 CE5E     000E64            4050             MVI   ASUB,DPABOTH    SET FLAG BOTH WANTED,WHAT WILL BE USED   03299000
                                        4051    *                              LATER WHEN CALLING THE FUNCTIONS         03309000
```

```
FLAG LOCTN OBJECT CODE     ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                          4052    ********************************************************************** 03319600
                                          4053    *                                                                    * 03320200
                                          4054    *       WE ARE HERE ONLY IF THE DPAFLAG IS SET WITH A CORRECT VALUE  * 03320800
                                          4055    *       BUT WE HAVE TO TRANSFORM THIS VALUE BECAUSE IT IS GIVEN 04   * 03321500
                                          4056    *       08 OR 12 AS VALUE AND IT IS ONLY EXPECTED 01 OR 02 OR 03.    * 03322100
                                          4057    *                                                                    * 03322700
                                          4058    ********************************************************************** 03323300


0000EC                                    4059    ONESET   DS    0Y                                                      03329000
0000EC 17 33                              4060            XR    R#03,R#03          CLEAR REGISTER 3,OTHERWISE STRANGE   03339000
                                          4061    *                                EFFECTS CAN BE OBSERVED....          03349000
0000EE D2 00 CE5F8028 000E65 000028       4062            MVC   ASUB+1(1),DPAFLAG  TRANSFORM THE VALUE OF SYSTEM OR USER 03359000
0000F4 94 DF CE5F     000E65              4063            NI    ASUB+1,DPAUSSET    FROM CALLER VALUE X'04' OR X'08' TO   03369000
0000F8 43 30 CE5F     000E65              4064            IC    R#03,ASUB+1        EXPECTED VALUE FOR THE SAME THING IN  03379000
0000FC 88 30 0002     000002              4065            SRL   R#03,2            AIDSYS05 WHERE IT IS EXPECTED THE    03389000
000100 94 F0 8028     000028              4066            NI    DPAFLAG,X'F0'      VALUE X'01' OR X'02' ,WITHOUT CHANGING 03399000
000104 42 30 CE5F     000E65              4067            STC   R#03,ASUB+1        THE FIRST HALF BYTE OF THE FLAG WHICH 03409000
000108 D6 00 8028CE5F 000028 000E65       4068            OC    DPAFLAG(1),ASUB+1  IS USED FOR OTHER PURPOSE.          03419000



                                          4069    *                                NOW,WE CAN CONTINUE TESTING FOR OTHERS 03430000
                                          4070    *                                FIELD.IF THE FUNCTION TO BE CALLED IS  03432000
                                          4071    *                                GET ADDRESS THEN NO TEST TO BE DONE    03433000
                                          4072    *                                ABOUT THE BUFFER BECAUSE NO ONE IS     03435000
                                          4073    *                                TO BE PROVIDED.                        03437000



00010E 91 DF 8028     000028              4074            TM    DPAFLAG,DPAFLAGT   FIRST CALL OR SUCCESSIVE CALL?      03519000
                                          4075    *                                THE MASK TO TEST IT IS X'20'           03529000
000112 47 10 C14A     000150              4076            BO    NOTEST             SUCCESSIVE CALL,THEN NO CONTROL NEEDED 03539000
                                          4077    *                                FIRST CALL? OR WRONG VALUE ASSIGNED?   03549000
                                          4078    *                                IF NOT 4 OR 8 OR C THEN FORMAL FEHLER  03559000



000116 95 04 8000     000000              4079            CLI   DPAFCT,DPAGASFT    TEST IF IT IS THE GET ADDRES FUNCTION  03570000
00011A 47 80 C2BE     0002C4              4080            BE    GAFCT              IF YES,THEN NO MORE TEST NEEDED GO!    03572000



                                          4081    *     R E M E M B E R   A D D R E S S   =   0   => N O T G I V E N  03579000
                                          4082    *                                                                    03589000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                          4083  ********************************************************************** 03599900
                                          4084  *                                                                    * 03600800
                                          4085  *        ALL THE NEXT TEST ARE DONE IN ORDER TO VALIDATE THE BUFFER   * 03601700
                                          4086  *        1.BUFFER ADDRESS GIVEN ?                                     * 03602600
                                          4087  *                                IF NOT,GO FORMAL FEHLER              * 03603500
                                          4088  *        2.BUFFER ADDRESS WORD ALIGNED ?                              * 03604400
                                          4089  *                                IF NOT,GO FORMAL FEHLER              * 03605300
                                          4090  *        3.BUFFER LENGTH GIVEN ?                                      * 03606200
                                          4091  *                                IF NOT,GO FORMAL FEHLER              * 03607100
                                          4092  *        4.BUFFER LENGTH LESS THEN ONE RECORD LENGTH ?                 * 03608000
                                          4093  *                                IF YES,GO BUFFER TOO SHORT           * 03608090
                                          4094  *                                                                    * 03608180
                                          4095  ********************************************************************** 03608270

00011E 17 33                              4096        XR    R#03,R#03                                                03609000
000120 59 30 8020      000020             4097        C     R#03,DPABUFAD   TEST IF NO BUFFER ADDRESS IS GIVEN       03619000
000124 47 80 C15A      000160             4098        BE    RTNFF           IF NOT GIVEN,THEN BRANCH TO FORM.FEHLER  03629000

000128 91 03 8023      000023             4099        TM    DPABUFAD+3,DPAVALFW TEST IF THE ADDRESS IS FULLWORD      03649000
00012C 47 70 C15A      000160             4100        BNZ   RTNFF           ALIGNED,IF NOT BRANCH TO                 03659000
                                          4101  *                             FORMAL FEHLER(TEST OF TWO LEFTEST BITS)  03669000

000130 59 30 8024      000024             4102        C     R#03,DPABUFLE   TEST TO SE IF A BUFFER LENGTH IS GIVEN,  03779000
000134 47 80 C15A      000160             4103        BE    RTNFF           IF NOT BRANCH TO FORMAL FEHLER.          03789000

000138 41 30 CE52      000E58             4104        LA    R#03,TAB        LOAD ADDRESS OF THE TABLE CONTAINING     03809000
                                          4105  *                             THE MINIMAL BUFFER LENGTH FOR EACH FCT.  03814000
00013C D2 00 CE5F8000  000E65  000000     4106        MVC   ASUB+1(1),DPAFCT MOVE DONE BECAUSE OF HW ALIGNEMENT      03819000
000142 4A 30 CE5E      000E64             4107        AH    R#03,ASUB       ADD TO THE START ADDRESS THE SUBFUNCTION 03829000
                                          4108  *                             NUMBER IN ORDER TO OBTAIN THE MINIMAL    03839000
                                          4109  *                             BUFER LENGTH NEEDED BY THE SPECIFIED FCT 03849000
000146 D5 03 80243000  000024             4110        CLC   DPABUFLE,0(R#03) COMPARE TO SEE IF LENGTH IS ENOUGH TO    03859000
                                          4111  *                             CONTAIN ONE ANSWER AT LEAST!             03869000
00014C 47 40 C17A      000180             4112        BL    RTNBTS          IF NOT,BRANCH TO BUFFER TOO SHORT FEHLER 03879000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000150                          4113    NOTEST   DS    0Y              SECOND CALL DIRECT TO FUNCTION CALL.     03919000
                                    4114    ************************************************************************ 03929000
                                    4115    *                                                                      * 03939000
                                    4116    *       NO MORE TEST ALL ARE O.K. THEN CALL FUNCTION                   * 03949000
                                    4117    *                                                                      * 03959000
                                    4118    ************************************************************************ 03969000

    000150 95 04 8000      000000   4119             CLI   DPAFCT,DPAGASFT  IF SECOND CALL,THIS TEST IS IMPORTANT   03989000
    000154 47 80 C2BE      0002C4   4120             BE    GAFCT            IF FIRST CALL,IF GAFCT IT SHOULD NOT    03999000

                                    4121    *                              NO MORE COMMON TEST FOR ANY SUBFUNCTION 04019000
                                    4122    *                              AS THERE IS NO MORE VALID VALUE OF FLAG 04029000
                                    4123    *                              DPACSFCT THEN 0,4,8.THERE IS NO NEED TO 04039000
                                    4124    *                              DO SOME OTHER TEST .                    04049000
                                    4125    *                                                                      04059000
    000158 47 20 C41C      000422   4126             BH    PEFCT            IF DPACSFCT > 4,THEN PEFCT              04069000
    00015C 47 40 C19A      0001A0   4127             BL    CMFCT            IF < 4,THEN CSEC MAP FUNCTION           04079000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                          4128  ********************************************************************** 04099000
                                          4129  *                                                                    * 04109000
                                          4130  *        RETURN WITH FORMAL FEHLER.RETURN CODE IS X'04'               * 04119000
                                          4131  *                                                                    * 04129000
                                          4132  ********************************************************************** 04139000

000160                                    4133  RTNFF    DS    0Y                                                    04154000
000160 92 04 8001      000001             4134           MVI   DPARTN,DPACMFE  MOVE VALUE IN CORRECT RETURN CODE ZONE 04159000
000164 47 F0 C41C      000422             4135           B     RTN                                                     04169000

                                          4136  ********************************************************************** 04189000
                                          4137  *                                                                    * 04199000
                                          4138  *         NOT WORD ALIGNED ADDRESS.RETURN CODE IS X'0C'               * 04209000
                                          4139  *                                                                    * 04219000
                                          4140  ********************************************************************** 04229000

000168                                    4141  RTNNWA   DS    0Y                                                    04244000
000168 92 0C 8001      000001             4142           MVI   DPARTN,DPACMNWA MOVE VALUE IN RETURN CODE ZONE        04249000
00016C 47 F0 C41C      000422             4143           B     RTN                                                     04259000


                                          4144  ********************************************************************** 04259900
                                          4145  *                                                                    * 04260800
                                          4146  *        INVALID ADDRESS.RETURN CODE IS X'2C'                        * 04261700
                                          4147  *                                                                    * 04262600
                                          4148  ********************************************************************** 04263500

000170                                    4149  RTNIA    DS    0Y                                                    04264800
000170 92 2C 8001      000001             4150           MVI   DPARTN,DPACMIA  MOVE VALUE IN RETURN CODE ZONE        04265300
000174 47 F0 C41C      000422             4151           B     RTN             RETURN TO THE CALLER                    04266200

                                          4152  ********************************************************************** 04279000
                                          4153  *                                                                    * 04289000
                                          4154  *         FILE IS NOT OPEN.RETURN CODE IS X'10'                      * 04299000
                                          4155  *                                                                    * 04309000
                                          4156  ********************************************************************** 04319000

000178                                    4157  RTNOFE   DS    0Y                                                    04334000
000178 92 10 8001      000001             4158           MVI   DPARTN,DPACMOF  MOVE VALUE IN RETURN CODE ZONE        04339000
00017C 47 F0 C41C      000422             4159           B     RTN                                                     04349000

                                          4160  ********************************************************************** 04369000
                                          4161  *                                                                    * 04379000
                                          4162  *         LENGTH OF BUFFER NOT GREAT ENOUGH TO CONTAIN ONE ANSWER    * 04389000
                                          4163  *                              R C = X'34'                           * 04399000
                                          4164  ********************************************************************** 04409000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000180                           4165    RTNBTS   DS    0Y                                                    04424000
    000180 92 34 8001    000001      4166             MVI   DPARTN,DPACMTS  MOVE VALUE IN RETURN CODE ZONE        04429000
    000184 47 F0 C41C    000422      4167             B     RTN                                                   04434000



                                     4168    ************************************************************************ 04459000
                                     4169    *                                                                      * 04469000
                                     4170    *         INVALID LINK NUMBER GIVEN.RETURN CODE IS X'1C'               * 04479000
                                     4171    *                                                                      * 04489000
                                     4172    ************************************************************************ 04499000

    000188                           4173    RTNILN   DS    0Y                                                    04514000
    000188 92 1C 8001    000001      4174             MVI   DPARTN,DPACMILN MOVE VALUE IN RETURN CODE ZONE        04519000
    00018C 47 F0 C41C    000422      4175             B     RTN                                                   04529000

                                     4176    ************************************************************************ 04530200
                                     4177    *                                                                      * 04530800
                                     4178    *         INVALID INDICATOR OF DUMPFILE TYPE GIVEN.RC=X'20'            * 04531500
                                     4179    *                                                                      * 04532100
                                     4180    ************************************************************************ 04532700

    000190                           4181    RTNIIND  DS    0Y                                                    04534000
    000190 92 20 8001    000001      4182             MVI   DPARTN,DPACMIND  MOVE VALUE IN RETURN CODE ZONE        04534600
    000194 47 F0 C41C    000422      4183             B     RTN              RETURN TO CALLER                     04535200

                                     4184    ************************************************************************ 04536500
                                     4185    *                                                                      * 04537100
                                     4186    *         A(READ) GIVEN BUT NOT THE ITH. RETURN CODE = X'24'           * 04537700
                                     4187    *                                                                      * 04538300
                                     4188    ************************************************************************ 04538370

    000198                           4189    RTNRNI   DS    0Y                                                    04538530
    000198 92 24 8001    000001      4190             MVI   DPARTN,DPACMRNI  MOVE VALUE IN RETURN CODE             04538610
    00019C 47 F0 C41C    000422      4191             B     RTN              RETURN TO CALLER                     04538680
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
  0001A0                          4192    CMFCT    DS    0Y                                                                  04549000
                                  4193    ************************************************************************************* 04559000
                                  4194    * ********************************************************************************** 04569000
                                  4195    * *                                                                              * * 04579000
                                  4196    * *                                                                              * * 04589000
                                  4197    * *     THIS IS THE CALL FOR EXECUTING THE CMFCT,THE LAYOUT                      * * 04599000
                                  4198    * *     OF THE CALLING PARAMETERS IS :                                           * * 04609000
                                  4199    * *                                                                              * * 04619000
                                  4200    * *         DISPLACEMENT 00  NUMBER OF THE CMFCT = X'0'                          * * 04629000
                                  4201    * *                                                                              * * 04639000
                                  4202    * *         DISPLACEMENT 01  RETURN CODE FIELD.                                  * * 04649000
                                  4203    * *                                                                              * * 04659000
                                  4204    * *         DISPLACEMENT 04  LINK NUMBER OF DUMPFILE                             * * 04669000
                                  4205    * *                                                                              * * 04679000
                                  4206    * *         DISPLACEMENT 08  ADDRESS OF THE DUMPFILE READ ROUTINE                * * 04689000
                                  4207    * *                                                                              * * 04699000
                                  4208    * *         DISPLACEMENT 12  ADDRESS OF TCB                                      * * 04709000
                                  4209    * *                                                                              * * 04719000
                                  4210    * *         DISPLACEMENT 16  ADDRESS OF SYSBASE                                  * * 04711000
                                  4211    * *                                                                              * * 04712000
                                  4212    * *         DISPLACEMENT 20  ADDRESS OF XVT                                      * * 04713000
                                  4213    * *                                                                              * * 04714000
                                  4214    * *         DISPLACEMENT 24  INDICATOR OF DUMPFILE TYPE                          * * 04715000
                                  4215    * *                                                                              * * 04716000
                                  4216    * *         DISPLACEMENT 28  THE ITN NUMBER                                      * * 04717000
                                  4217    * *                                                                              * * 04719000
                                  4218    * *         DISPLACEMENT 32  ADDRESS OF THE BUFFER                               * * 04720000
                                  4219    * *                                                                              * * 04721000
                                  4220    * *         DISPLACEMENT 36  BUFFER LENGTH                                       * * 04723000
                                  4221    * *                                                                              * * 04724000
                                  4222    * *         DISPLACEMENT 40  FLAG FOR USER OR SYSTEM REACHED                     * * 04729000
                                  4223    * *                                                                              * * 04739000
                                  4224    * *         DISPLACEMENT 41  NAME OF PROGRAM UNIT                                * * 04749000
                                  4225    * *                                                                              * * 04759000
                                  4226    * *         DISPLACEMENT 84  NUMBER OF RETURNED RECORD                           * * 04762000
                                  4227    * *                                                                              * * 04765000
                                  4228    * *                                                                              * * 04769000
                                  4229    * ********************************************************************************** * 04779000
                                  4230    *                                                                                  * 04789000
                                  4231    *                                                                                  * 04799000
                                  4232    * ********************************************************************************** * 04809000
                                  4233    * *                                                                              * * 04819000
                                  4234    * *                                                                              * * 04829000
                                  4235    * *     THE OUTPUT WILL HAVE AS LAYOUT :                                         * * 04839000
                                  4236    * *                                                                              * * 04849000
                                  4237    * *                                                                              * * 05083692
                                  4238    * *           DISPLACEMENT  0   CSECT NAME                                       * * 05083702
                                  4239    * *                                                                              * * 05083712
                                  4240    * *           DISPLACEMENT  8   CSECT START ADDRESS                              * * 05083722
                                  4241    * *                                                                              * * 05083732
                                  4242    * *           DISPLACEMENT  12  CSECT LENGTH                                     * * 05083742
                                  4243    * *                                                                              * * 05083752
                                  4244    * *           DISPLACEMENT  16  ETPND INFORMATION                                * * 05083761
                                  4245    * *                                                                              * * 05083771
                                  4246    * *           THE RETURN CODE IS IN SPECIAL FIELD                                * * 05083801
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4247    * *                                                          * * 05083811
                                         4248    * *          IF IT IS NOT 0 OR x'28' THEN THE BUFFER IS EMPTY * * 05083821
                                         4249    * *                                                          * * 05083831
                                         4250    * *                                                          * * 05083841
                                         4251    * ************************************************************ * 05083851
                                         4252    *                                                            * 05083860
                                         4253    ************************************************************** 05083870

0001A0 41 10 C4F2      0004F8            4254            LA     R#01,WORKAREA          COVER PARAM LIST          05083890
000000                                   4255            USING  SERVE,R#01                                       05083900

0001A4 92 10 1012      000012            4256            MVI    ASASBFCT,ASADSDPG      MOVE SUBFUNCTION REQUEST  05088355
                                         4257    *                                     CSECT LEVEL.              05099000
0001A8 D2 03 102C8020  00002C 000020     4258            MVC    ASADSAUB(4),DPABUFAD   MOVE ADDRESS OF THE CALLER 05109000
                                         4259    *                                     BUFFER.                   05119000
0001AE D2 01 10308026  000030 000026     4260            MVC    ASADSLUB(2),DPABUFLE+2 LENGTH OF BUFFER          05129000
                                         4261    *                                                               05134000
0001B4 D2 05 1004C44A  000004 000450     4262            MVC    ASACALL1(6),=C'AIDSYS' AS AIDSYS REQUEST!!!!!!!!!!!! 05139000
                                         4263    *                                                               05144000
0001BA 92 10 101B      00001B            4264            MVI    ASADSUSE,ASADUMP       TO SIMULATE DUMP FILE ACCESS 05149000
                                         4265    *                                                               05154000
0001BE 92 10 1034      000034            4266            MVI    ASADSLEV,ASADSLCS      CSECT LEVEL               05159000
                                         4267    *                                                               05160000
0001C2 D2 00 101A8007  00001A 000007     4268            MVC    ASADSDFN(4-DPALNKL),DPALINK+DPALNKL              05162000
                                         4269    *                                                               05163000
0001C8 D2 00 1019801F  000019 00001F     4270            MVC    ASADSITN+4-DPAITNL(4-DPAITNL),DPAITN+DPAITNL     05165000

0001CE 91 40 CE5E      000E64            4271            TM     ASUB,DPABOTH           TEST IF BOTH ARE SPECIFIED 05179000
                                         4272    *                                     BEFORE DOING THE MOVE     05189000
0001D2 47 E0 C1D4      0001DA            4273            BNO    ENDPARAM               IF NOT MOVE WITHOUT CARE  05199000

0001D6 94 FD 8028      000028            4274            NI     DPAFLAG,DPARESET       RESET SYSTEM VALUE AND LET DO 05219000
                                         4275    *                                     THE CALL FOR NON PRIVILEGED 05229000
                                         4276    *                                     CSECT MAP,WHAT IS TOLD TO BE 05239000
                                         4277    *                                     DONE IN THE EXTERNAL INTERFACE 05249000

0001DA                                   4278    ENDPARAM DS    0Y                                               05269000
0001DA D6 00 101B8028  00001B 000028     4279            OC     ASADSUSE,DPAFLAG       SET EXPECTED FLAG FROM AIDSYS05 05279000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4280    ********************************************************************** 05299000
                                         4281    *                                                                    * 05309000
                                         4282    *        THE AREA NEEDED TO COVER AIDSYS STATDATA,IS RESERVED AT     * 05319000
                                         4283    *        THE END OF THE PROGRAM.IT'S LENGTH IS GIVEN IN THE ASERP    * 05329000
                                         4284    *        MACRO.                                                      * 05339000
                                         4285    *                                                                    * 05349000
                                         4286    ********************************************************************** 05359000


0001E0 58 40 C432     000438             4287            L     R#04,=A(MYDYNDTA)  COVER DYNDATA NEEDED BY AIDSYS       05379000
000000                                   4288            USING DYNDATA,R#04                                            05382000


0001E4 D2 03 49408014 000940 000014      4289            MVC   DXVTBASE,DPAAXVT  MOVE THESE VALUES IN ORDER TO SIMULATE 05385000
0001EA 50 10 40F0     0000F0             4290            ST    R#01,APARAM       THIS FIELD IS USED IN ASDPROG(ADSERV)  05385200
                                         4291    *                                                                     05385300
0001EE D2 03 4A7C800C 000A7C 00000C      4292            MVC   DUMPATCB,DPAATCB     MOVE IMPORTANT IF A ITN IS GIVEN   05385500
                                         4293    *                                                                     05386200
0001F4 D2 03 4008C436 000008 00043C      4294            MVC   ARET,=A(WORKAREA+2000) AIDSYS02,WHICH IS THE MODULE     05387000
                                         4295    *                                 RESPONSABLE FOR SETTING THESE FIELD.  05388000
                                         4296    *                                                                     05388200
0001FA D2 03 4B20C43A 000B20 000440      4297            MVC   REQRQADR,=A(WRKETPND) BUFFER FOR ETPND FUNCTION.        05388500


                                         4298    ********************************************************************** 05399000
                                         4299    *                                                                    * 05409000
                                         4300    *        THE MEMORY REQUESTED BY AIDSYS IN ORDER TO COVER DYNDATA    * 05419000
                                         4301    *        IS RESERVED HERE AT THE END OF THE PROGRAM.IT'S LENGTH      * 05429000
                                         4302    *        IS GIVEN IN THE ASERP MACRO.                                * 05439000
                                         4303    *                                                                    * 05449000
                                         4304    ********************************************************************** 05459000


000200 58 50 C43E     000444             4305            L     R#05,=A(MYSTATDT)  SAVE ADDRESS OF MEMORY COVERING STATD 05469000
                                         4306    *       LA    R#01,WORKAREA      COVER PARAM LIST                     05479000
000204 50 D0 C45E     000464             4307            ST    R#13,SAVE          SAVE REGISTER 13                     05489000
                                         4308    *       LA    R#13,SAVE1         SAVE AREA FOR CALLING PARAMETERS     05519000


                                         4309    ********************************************************************** 05539000
                                         4310    *                                                                    * 05549000
                                         4311    *        THE PARAMETERS ARE READY FOR CALL AND ALSO THE REGISTERS    * 05559000
                                         4312    *                                                                    * 05569000
                                         4313    ********************************************************************** 05579000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4314    ********************************************************************************* 05610000
                                        4315    *                                                                               * 05630000
                                        4316    *       WHAT ISDONE HERE IS TO SIMULATE THE DISPOSITION OF DATAS                * 05660000
                                        4317    *       WHICH ARE NORMALY PROVIDED BY AIDSYS02 AND WHICH HERE ARE               * 05680000
                                        4318    *       PROVIDED DIRECTLY BY THE CALLER                                         * 05700000
                                        4319    *                                                                               * 05730000
                                        4320    ********************************************************************************* 05750000


000000                                  4321            USING STATDATA,R#05           COVER STATDATA FOR FINDING          05753000
                                        4322    *                                     A(DFTAB)                            05754000
                                        4323            AIDSCOD GETDFTAB,P1=R#06,P2=R#07,P3=ASADSDFN,P4=DFTAB             05755000
                                        4324  1         IDLKG VER=009
                                        4325  2               *,VERSION 009                                                00001300
000208                                  4326  2         CNOP  0,4                                                          00002800
000208                                  4327  2         DS    0F                                                           00003500
000208 17 66                            4328  1         XR    R#06,R#06       CLEAR REG
00020A 43 60 101A       00001A          4329  1         IC    R#06,ASADSDFN       GET LINK #
00020E 89 60 0003       000003          4330  1         SLL   R#06,3          REL. A(ENTRY IN DF-TABLE)
000212 41 70 5260       000260          4331  1         LA    R#07,DFTAB      A(DF-TABLE)
000216 1A 67                            4332  1         AR    R#06,R#07       A(ENTRY IN DF-TABLE)
000218 50 60 4278       000278          4333  1         ST    R#06,DYDFPOIT   SAVE ADDRESS


00021C D2 03 6000C442         000448    4334            MVC   0(4,R#06),=A(WORKAREA+1024) SIMULATE THAT THIS FIELD  05756000
                                        4335    *                                     WAS FULFILLED WHEN OPEN(NORMALY     05757000
                                        4336    *                                     DONE BY AIDSYS02)                   05757500
000222 58 70 6000                       4337            L     R#07,0(0,R#06)          LOAD A(DUMPFILE-WORKAREA)           05758000
                                        4338    *                                                                         05759000
000226 12 77                            4339            LTR   R#07,R#07               DUMPFILE OPEN ?                     05761000
000228 47 80 C172       000178          4340            BZ    RTNOFE                  NO.                                 05764000


00022C 50 70 40EC       0000EC          4341            ST    R#07,DWORK              SAVE ADDRESS                        05767000
000000                                  4342            USING WORK,R#07                                                   05770000
                                        4343    *                                                                         05771000
000230 D2 03 72D88010 0002D8 000010     4344            MVC   WAVIRT(4),DPASYSBS      STORE A(SYSBASE) IN THE RIGHT       05773000
                                        4345    *                                     PLACE SO THAT AIDSYS05 WILL GET     05776000
                                        4346    *                                     IT WITHOUT TROUBLE AS IF IT WAS     05776300
                                        4347    *                                     GONE TROUGH THE USUAL WAY.          05776600
000236 D2 00 730B801B 00030B 00001B     4348            MVC   WAIND,DPAIND+DPAINDL    WAIND IS ONLY A BYTE BUT DPAIND     05776900
                                        4349    *                                     IS A FULLWORD                       05777200
00023C D2 03 72F48014 0002F4 000014     4350            MVC   WAXVT,DPAAXVT           MOVE A(XVT) IN THE FIELD USED       05777500
                                        4351    *                                     LATER BY ADSERV.                    05777600
                                        4352            DROP R#07,R#05,R#04                                               05777800
```

```
FLAG LØCTN ØBJECT CØDE    ADDR1  ADDR2  STMNT M  SØURCE STATEMENT
                                        4353    ********************************************************************** 05789000
                                        4354    *                                                                    * 05799000
                                        4355    *      N E V E R   C H A N G E   T H E   V A L U E                   * 05809000
                                        4356    *              Ø F   T H E   R E G I S T E R                         * 05819000
                                        4357    *                                                                    * 05829000
                                        4358    *       THESE VALUES ARE NEEDED BY AIDSYS05!!!                       * 05839000
                                        4359    *       ======================================                       * 05849000
                                        4360    *                                                                    * 05859000
                                        4361    *                                                                    * 05869000
                                        4362    ********************************************************************** 05879000


                                        4363    *                                                                      05899000
                                        4364    *                                                                      05909000
                                        4365    *                                                                      05919000
000242 41 D0 C45E     000464            4366          LA    R#13,SAVE          RESTØRE ADRESS ØF SAVE AREA LØST        05929000
000246 50 C0 C45E     000464            4367          ST    R#12,SAVE          BY AIDSYS02,AND SAVE R#12,DESTRØYED     05939000
00024A 58 C0 C446     00044C            4368          L     R#12,=V(ADSERV)    BY THE CALL TØ AIDSYS05(WHICH           05949000
00024E 05 EC                            4369          BALR  R#14,R#12          EXSPECTS TØ HAVE THE RIGHT VALUE IN     05959000
000250 58 CD 0000     000000            4370          L     R#12,0(R#13)       REGISTER 12  RESTØRE IT.                05969000

000254 58 80 C4EE     0004F4            4371          L     R#08,SAVEREG8            RESTØRE CALLER PARAMETER LIST     05975000
                                        4372    *                                ADDRESS WHICH HAD BEEN LØØSED     05975400
000258 91 30 8001     000001            4373          TM    DPARTN,DPACMPRE          TEST IF AN ERRØR HAS ØCCURED      05975800
00025C 47 10 C41C     000422            4374          BØ    RTN                      DURING THE READ PAGE RØUTINE      05976600


                                        4375    ********************************************************************** 05989000
                                        4376    *                                                                    * 05999000
                                        4377    *       WHAT IS DØNE HERE IS TØ CHECK IF AN ERRØR HAS ØCCURED        * 06009000
                                        4378    *       DURING THE EXECUTIØN ØF AIDSYS05.THE PRØBLEM IS THAT IF      * 06019000
                                        4379    *       THE CALLER HAS SPECIFIED BØTH DØMAIN WANTED,IT IS PØSSIBLE   * 06029000
                                        4380    *       THAT WHAT WE ASSUMED FIRST WAS NØT THE CØRRECT DECISIØN,THEN * 06039000
                                        4381    *       A FURTHER CALL IS NEEDED.IF IT IS NØT THE CASE,THEN IT IS    * 06049000
                                        4382    *       A REAL ERRØR AND THEN HAS TØ BE PRØCESSED LIKE A CØMMØN      * 06050000
                                        4383    *       ERRØR.IT IS ALSØ THE PRØBLEM ØF TRANSLATING THE RETURN       * 06052000
                                        4384    *       CØDE ØF AIDSYS05 IN THE RETURN CØDE ØF THIS TØØL.            * 06053000
                                        4385    *                                                                    * 06059000
                                        4386    ********************************************************************** 06069000


000260 91 40 CE5E     000E64            4387          TM    ASUB,DPABØTH       TEST IF THERE WAS BØTH USER             06089000
                                        4388    *                              AND SYSTEM WANTED.                      06099000
000264 47 E0 C2A2     0002A8            4389          BNØ   ERR                DØN'T CARE ABØUT THIS                   06109000


000268 91 08 1013     000013            4390          TM    ASARETRN,ASADSERN  IF BØTH SET THE ØNLY THREE            06129000
                                        4391    *                              CASES TØ TAKE IN CØNSIDERATIØN          06139000
                                        4392    *                              HAVE AS CØMMØN BIT SET IN THE           06149000
                                        4393    *                              RETURN CØDE IS X'08' WHICH              06159000
                                        4394    *                              IS TESTED HERE,ØTHERWISE                06169000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    00026C 47 E0 C2A2     0002A8         4395          BNO   ERR                IT IS A REAL ERROR              06179000


    000270 97 40 CE5E     000E64         4396          XI    ASUB,DPABOTH       RESET THE FLAG BECAUSE          06189000
                                         4397  *                                FIRST TRY WAS UNSUCCESSFULL     06199000
    000274 17 DD                         4398          XR    R#13,R#13          CLEAR R#13 FOR SECURITY         06209000
    000276 43 D0 8028     000028         4399          IC    R#13,DPAFLAG       TAKE THE FLAG SET FOR USER      06219000
    00027A 88 D0 0001     000001         4400          SRL   R#13,1              FOR SEARCH AND SET IT FOR       06229000
    00027E 89 D0 0001     000001         4401          SLL   R#13,1              SEARCHING FOR SYSTEM            06239000
    000282 96 08 000D     00000D         4402          OI    R#13,DPASYST                                       06249000
    000286 42 D0 101B     00001B         4403          STC   R#13,ASADSUSE                                      06259000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4404   ********************************************************************** 06260200
                                         4405   *                                                                    * 06260800
                                         4406   *        THE SUPPOSITION DONE DURING THE FIRST CALL WAS WRONG         * 06261500
                                         4407   *        IT WAS NOT A NON PRIVILEGE ACCESS TO BE DONE(OR IT IS        * 06262100
                                         4408   *        POSSIBLY A MISTAKE) THEN THE NEXT CALL IS DONE WITH          * 06262700
                                         4409   *        A PRIVILEGED ACCESS IF THIS ALSO FAILS,THEN RETURN WITH      * 06263300
                                         4410   *        THE APROPRIATE RETURN CODE.                                  * 06264000
                                         4411   *                                                                    * 06264600
                                         4412   ********************************************************************** 06265200

00028A 41 D0 C45E      000464            4413           LA     R#13,SAVE                RESTORE ADDRESS OF THE SAVE   06266500
00028E 50 C0 C45E      000464            4414           ST     R#12,SAVE                AREA LOST BY AIDSYS05 AND     06267100
000292 58 C0 C446      00044C            4415           L      R#12,=V(ADSERV)          SAVE R#12 DESTROYED BY THE    06267700
000296 05 EC                             4416           BALR   R#14,R#12                CALL TO AIDSYS05(THINKING TO  06268300
000298 58 CD 0000      000000            4417           L      R#12,0(R#13)             HAVE THE RIGHT VALUE IN R#12) 06269000
00029C 58 80 C4EE      0004F4            4418           L      R#08,SAVEREG8            RESTORE A(CALLER PARAMETER    06270000
                                         4419   *                                       LIST) HAD BEEN LOOSED         06271000

0002A0 91 30 8001      000001            4420           TM     DPARTN,DPAGAPRE          TEST IF AN ERROR IN THE       06273000
0002A4 47 10 C41C      000422            4421           BO     RTN                      CALLER PAGE READ ROUTINE HAS  06275000
                                         4422   *                                       OCCURED.IF YES,RETURN TO HIM  06277000
                                         4423   *                                       DIRECTLY FLAG WAS YET SET.    06278000

                                         4424   ********************************************************************** 06280000
                                         4425   *                                                                    * 06281000
                                         4426   *        THE NEXT TEST ARE THE COMMON TEST DONE TO SEE IF SOME        * 06282000
                                         4427   *        ERRORS HAD OCCURED DURING THE PERFORMING OF AIDSYS05         * 06284000
                                         4428   *        THESE TESTS ARE DONE IF ONLY ONE CALL WAS DONE.              * 06285000
                                         4429   *        BUT ALSO IF,AFTER THE SECOND CALL OF AIDSYS05(IF ANY),       * 06285090
                                         4430   *        AN ERROR WAS DISCOVERED WHEN EXECUTING IT TWICE(WHICH WILL   * 06285180
                                         4431   *        TELL US THAT NOTHING WAS FOUND).                             * 06285270
                                         4432   *                                                                    * 06285360
                                         4433   ********************************************************************** 06286000

0002A8                                   4434   ERR    DS     0Y                                                     06289000
                                         4435   *                                                                     06294000
                                         4436   *                                                                     06296000
0002A8 91 FF 1084      000084            4437           TM     ASADSFBR,DPARTNT         X'FF' NO MORE INFO            06299000
0002AC 47 80 C2AE      0002B4            4438           BZ     REALERR                  TEST IF ASARETRN IS SET       06309000
                                         4439   *                                                                     06314000
0002B0 92 08 1013      000013            4440           MVI    ASARETRN,ASADSMOR        SET BUFFER OVFLW              06319000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

    0002B4                          4441    REALERR  DS    0Y                                                    06329000
    0002B4 91 FF 1013     000013    4442             TM    ASARETRN,DPARTNT  TEST IF ERROR OCCURED DURING        06339000
    0002B8 47 80 C41C     000422    4443             BZ    RTN               EXECUTION OF AIDSYS05               06349000
                                    4444    *                                                                     06354000
    0002BC 41 30 CE62     000E68    4445             LA    R#03,TABCMFCT     CONVERSION TABLE FOR ERROR HANDLING 06359000
    0002C0 47 F0 C3EE     0003F4    4446             B     ERRHANDL          GOTO COMMON ROUTINE FOR ERROR       06369000
```

```
FLAG LØCTN ØBJECT CØDE    ADDR1  ADDR2  STMNT M  SØURCE STATEMENT
    0002C4                           4447    GAFCT    DS    0Y                                                          06609000
                                     4448    ************************************************************************** 06619000
                                     4449    *                                                                        * 06629000
                                     4450    * ********************************************************************** * 06639000
                                     4451    * *                                                                    * * 06649000
                                     4452    * *                                                                    * * 06659000
                                     4453    * *     THIS PART IS RESPØNSABLE ØF THE EXECUTIØN ØF GA FUNCTIØN       * * 06669000
                                     4454    * *                                                                    * * 06679000
                                     4455    * *     IT IS EXSPECTED THAT THE CALLER GIVES :                        * * 06689000
                                     4456    * *                                                                    * * 06699000
                                     4457    * *      AT DISPLACEMENT 0   NUMBER ØF THE FUNCTIØN,HERE X'04'         * * 06709000
                                     4458    * *                                                                    * * 06719000
                                     4459    * *      AT DISPLACEMENT 1   RETURN CØDE FIELD.                        * * 06729000
                                     4460    * *                                                                    * * 06739000
                                     4461    * *      AT DISPLACEMENT 4   DUMPFILE LINK NUMBER.                     * * 06749000
                                     4462    * *                                                                    * * 06759000
                                     4463    * *      AT DISPLACEMENT 8   ADDRESS ØF THE DUMPFILE READ RØUTINE      * * 06769000
                                     4464    * *                                                                    * * 06770000
                                     4465    * *      AT DISPLACEMENT 12  ADDRESS ØF THE TCB.                       * * 06771000
                                     4466    * *                                                                    * * 06772000
                                     4467    * *      AT DISPLACEMENT 16  ADDRESS ØF SYSBASE .                      * * 06773000
                                     4468    * *                                                                    * * 06774000
                                     4469    * *      AT DISPLACEMENT 20  ADDRESS ØF XVT.                           * * 06775000
                                     4470    * *                                                                    * * 06776000
                                     4471    * *      AT DISPLACEMENT 24  INDICATØR ØF DUMPFILE TYPE                * * 06777000
                                     4472    * *                                                                    * * 06778000
                                     4473    * *      AT DISPLACEMENT 28  ITN NUMBER,IF ANY                         * * 06778100
                                     4474    * *                                                                    * * 06778200
                                     4475    * *      AT DISPLACEMENT 40  THE FLAG BYTE                             * * 06778300
                                     4476    * *                                                                    * * 06778500
                                     4477    * *      AT DISPLACEMENT 44  THE GIVEN ADDRESS                         * * 06778600
                                     4478    * *                                                                    * * 06779000
                                     4479    * *                                                                    * * 06789000
                                     4480    * ********************************************************************** * 06799000
                                     4481    *                                                                        * 06809000
                                     4482    *                                                                        * 06819000
                                     4483    *****      I T   I S   N ØT   C ØN T R ØL E D                        ***** 06829000
                                     4484    *****                                                                  ***** 06839000
                                     4485    *****      T H A T   T H E   U S E R   H A S                          ***** 06849000
                                     4486    *****                                                                  ***** 06859000
                                     4487    *****      G I V E N   T H E   P L A C E                              ***** 06869000
                                     4488    *****                                                                  ***** 06879000
                                     4489    *****      E N ØU G H   F ØR   T H E   R E T U R N E D                ***** 06889000
                                     4490    *****                                                                  ***** 06899000
                                     4491    *****      I N F ØR M A T I ØN  ! ! ! ! !                             ***** 06909000
                                     4492    *****                                                                  ***** 06919000
                                     4493    *****                                                                  ***** 06929000
                                     4494    ************************************************************************** 06939000
                                     4495    ************************************************************************** 06949000
                                     4496    ************************************************************************** 06959000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    0002C4 41 10 C4F2     0004F8         4497          LA    R#01,WORKAREA      COVER PARAM LIST                    06979000*
    000000                               4498          USING SERVE,R#01                                             06989000

    0002C8 92 4C 1011     000011         4499          MVI   ASAFCT,ASADS      MOVE WHICH FUNCTION HAS TO BE CALLED 06999000
                                         4500    *                                                                  07004000
    0002CC 92 08 1012     000012         4501          MVI   ASASBFCT,ASADSCFA  SUBFUNCTION ENVIRONMENT             07009000
                                         4502    *                                                                  07014000
    0002D0 D2 05 1004C44A 000004 000450  4503          MVC   ASACALL1(6),=C'AIDSYS'   SIMULATE THE NORMAL CALL      07019000
                                         4504    *                                                                  07024000
    0002D6 92 10 101B     00001B         4505          MVI   ASADSUSE,ASADUMP   DUMPFILE ACCESS                     07029000
                                         4506    *                                                                  07034000
    0002DA 92 00 1034     000034         4507          MVI   ASADSLEV,X'00'     CLEAR THIS FIELD                    07039000
                                         4508    *                                                                  07044000
    0002DE D2 03 102C802C 00002C 00002C  4509          MVC   ASADSADR(4),DPAGAVA  USER VIRTUAL ADDRESS WANTED       07049000
                                         4510    *                                                                  07049050
    0002E4 D2 00 101A8007 00001A 000007  4511          MVC   ASADSDFN(4-DPALNKL),DPALINK+DPALNKL                    07049100
                                         4512    *                                                                  07049200
    0002EA D2 00 1019801F 000019 00001F  4513          MVC   ASADSITN+4-DPAITNL(4-DPAITNL),DPAITN+DPAITNL           07049300

    0002F0 91 40 CE5E     000E64         4514          TM    ASUB,DPABOTH       TEST IF BOTH PRIVILEGED AND         07050000
                                         4515    *                              NON PRIVILEGED FLAG IS SET          07051000
    0002F4 47 10 C414     00041A         4516          BO    RTNAIC             IF YES,BRANCH TO ADDRESS IN         07052000
                                         4517    *                              CONFLICT                            07053000
                                         4518    *                              WITH FLAG IS SET                    07054000

    0002F8 D6 00 101B8028 00001B 000028  4519          OC    ASADSUSE,DPAFLAG   SET EXPECTED FLAG FROM AIDSYS05       07059000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4520    ********************************************************************************* 07079000
                                         4521    *                                                                               * 07089000
                                         4522    *        MYDYNDTA WILL SERVE AS BASE FOR DYNDATA                                * 07099000
                                         4523    *                                                                               * 07109000
                                         4524    ********************************************************************************* 07119000

  0002FE 58 40 C432     000438           4525            L     R#04,=A(MYDYNDTA)   COVER THE EXSPECTED DYNDATA           07139000
  000000                                 4526            USING DYNDATA,R#04        COVER DYNDATA IN ORDER TO BE ABLE    07140000

  000302 D2 03 49408014 000940 000014    4527            MVC   DXVTBASE,DPAAXVT    TO SET FIELDS WHICH ARE NORMALLY     07142000
                                         4528    *                                                                             07142100
  000308 50 10 40F0     0000F0           4529            ST    R#01,APARAM         FIELD USED IF SYSTEM DOMAIN FLAG SET 07142200
                                         4530    *                                                                             07142300
  00030C D2 03 493C8010 00093C 000010    4531            MVC   DSYSBASE,DPASYSBS                                          07142600
                                         4532    *                                                                             07143000
  000312 D2 03 4A7C800C 000A7C 00000C    4533            MVC   DUMPATCB,DPAATCB    MOVE IMPORTANT IF AN ITN IS GIVEN    07144000
                                         4534    *                                                                             07144500
  000318 D2 03 4008C436 000008 00043C    4535            MVC   ARET,=A(WORKAREA+2000)    SUPPOSED BEEN SET WHEN USED BY 07145000
                                         4536    *                                       AS4ITNDP AND BY AS4RDPGE       07146000

                                         4537    ********************************************************************************* 07149000
                                         4538    *                                                                               * 07159000
                                         4539    *        MYSTATDTA      COVER THE STATDATA                                      * 07169000
                                         4540    *                                                                               * 07179000
                                         4541    ********************************************************************************* 07189000

  00031E 58 50 C43E     000444           4542            L     R#05,=A(MYSTATDT)   REGISTER 4 HAS ALWAYS TO COVER         07209000
                                         4543    *                                 DYNDATA,AND REGISTER 5 HAS ALWAYS    07219000
                                         4544    *                                 TO COVER STATDATA!!!!!!!!!           07229000
                                         4545    *        LA    R#13,SAVE1          LOAD A NEW SAVE AREA                 07239000

  000322 41 10 C4F2     0004F8           4546            LA    R#01,WORKAREA       REGISTER 1 WAS DESTROYED             07549000
  000326 41 D0 C45E     000464           4547            LA    R#13,SAVE                                                07559000
  00032A 50 C0 C45E     000464           4548            ST    R#12,SAVE           REGISTER 12 IS BASE REGISTER FOR A5  07569000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                  4549    ********************************************************************************* 07589000
                                  4550    *                                                                               * 07599000
                                  4551    *        ALL THINGS ARE READY NOW FOR THE FIRST CALL TO AIDSYS05                * 07609000
                                  4552    *        THERE WILL BE ANOTHER ONE BECAUSE THE FIRST GET THE                    * 07619000
                                  4553    *        POINTERS AND THE SECOND ONE GETS THE INFORMATION.                      * 07629000
                                  4554    *                                                                               * 07639000
                                  4555    ********************************************************************************* 07649000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4556    ********************************************************************** 07659400
                                        4557    *                                                                    * 07659900
                                        4558    *       WHAT IS DONE HERE IS TO SIMULATE THE DISPOSITION OF DATAS    * 07660400
                                        4559    *       WHICH ARE NORMALY PROVIDED BY AIDSYS02 AND WHICH HERE ARE    * 07660900
                                        4560    *       PROVIDED DIRECTLY BY THE CALLER.                             * 07661300
                                        4561    *                                                                    * 07661800
                                        4562    ********************************************************************** 07662300


000000                                  4563            USING STATDATA,R#05          COVER STATDATA FORT FINDING       07663700
                                        4564    *                                    A(DFTAB)                          07664200

                                        4565            AIDSCOD GETDFTAB,P1=R#06,P2=R#07,P3=ASADSDFN,P4=DFTAB          07664700
                                        4566  1         IDLKG VER=009
                                        4567  2               *,VERSION 009                                            00001300
00032E 0700                             4568  2         CNOP  0,4                                                      00002800
000330                                  4569  2         DS    0F                                                       00003500
000330 17 66                            4570  1         XR    R#06,R#06        CLEAR REG
000332 43 60 101A       00001A          4571  1         IC    R#06,ASADSDFN        GET LINK #
000336 89 60 0003       000003          4572  1         SLL   R#06,3           REL. A(ENTRY IN DF-TABLE)
00033A 41 70 5260       000260          4573  1         LA    R#07,DFTAB       A(DF-TABLE)
00033E 1A 67                            4574  1         AR    R#06,R#07        A(ENTRY IN DF-TABLE)
000340 50 60 4278       000278          4575  1         ST    R#06,DYDFPOIT    SAVE ADDRESS


000344 D2 03 6000C442          000448   4576            MVC   0(4,R#06),=A(WORKAREA+1024)                             07664900
                                        4577    *                                                                    07665000
00034A 58 70 6000                       4578            L     R#07,0(0,R#06)       LOAD A(DUMPFILE-WORKAREA)           07665100
00034E 12 77                            4579            LTR   R#07,R#07            DUMPFILE OPEN?                    07665600
000350 47 80 C172       000178          4580            BZ    RTNOFE               NO,GO AHEAD                       07666100


000354 50 70 40EC       0000EC          4581            ST    R#07,DWORK                                               07666600



000000                                  4582            USING WORK,R#07                                                07667000
000358 D2 03 72D88010 0002D8 000010     4583            MVC   WAVIRT,DPASYSBS      STORE A(SYSBASE) IN THE RIGHT       07667500
                                        4584    *                                  PLACE SO THAT AIDSYS05 WILL GET     07668000
                                        4585    *                                  IT WITHOUT TROUBLE AS IF IT WAS     07668500
                                        4586    *                                  GONE TROUGH THE USUAL WAY.          07668580
00035E D2 00 730B801B 00030B 00001B     4587             MVC   WAIND,DPAIND+DPAINDL WAIND IS ONLY A BYTE BUT DPAIND     07668660
                                        4588    *                                  IS A FULLWORD                       07668740
000364 D2 03 72F48014 0002F4 000014     4589             MVC   WAXVT,DPAAXVT                                           07668830


                                        4590             DROP  R#04,R#05,R#07                                          07668910
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        4591    ********************************************************************** 07669000
                                        4592    ********************************************************************** 07679000
                                        4593    ***                                                                *** 07689000
                                        4594    ***     B E T W E E N  T H E  C A L L  O F  A I D S Y S 0 5        *** 07699000
                                        4595    ***                                                                *** 07709000
                                        4596    ***     D O  N O T  C H A N G E  T H E  C O N T A I N              *** 07719000
                                        4597    ***                                                                *** 07729000
                                        4598    ***     O F  T H E  R E G I S T E R S .                            *** 07739000
                                        4599    ***                                                                *** 07749000
                                        4600    ***     A L L  A R E  U S E D  W I T H  T H E  V A L U E            *** 07759000
                                        4601    ***                                                                *** 07769000
                                        4602    ***     L E F T  I N  I T  B Y  T H E  L A T E S T                 *** 07779000
                                        4603    ***                                                                *** 07789000
                                        4604    ***   A I D S Y S  C A L L  T H A T  W O U L D  B E                *** 07799000
                                        4605    ***                                                                *** 07809000
                                        4606    ***    A  D E S A S T R O U S  T H I N G ! ! ! !                   *** 07819000
                                        4607    ***                                                                *** 07829000
                                        4608    ***                                                                *** 07839000
                                        4609    ********************************************************************** 07849000
                                        4610    ********************************************************************** 07859000

00036A 58 C0 C446       00044C          4611            L     R#12,=V(ADSERV)  CALL NOW AIDSYS05                      07879000
00036E 05 EC                            4612            BALR  R#14,R#12        AIDSYS05,EXSPECT THE RIGHT VALUE         07889000
                                        4613    *                              IN REGISTER 12                           07899000
000370 58 CD 0000       000000          4614            L     R#12,0(R#13)     DON'T TOUCH AT THIS,THIS IS DANGER.      07909000

000374 58 80 C4EE       0004F4          4615            L     R#08,SAVEREG8    RESTORE A(CALLER PARAMETER LIST)         07912000

000378 91 30 8001       000001          4616            TM    DPARTN,DPAGAPRE  TEST IF AN ERROR HAS OCCURED WHEN       07915000
00037C 47 10 C41C       000422          4617            BO    RTN              EXECUTING THE CALLER PAGE READ           07917000
                                        4618    *                              RETURN TO HIM DIRECTLY FLAG WAS YET      07918000
                                        4619    *                              CORRECTLY SET                            07918500

                                        4620    ********************************************************************** 07929000
                                        4621    *                                                                  * 07939000
                                        4622    *       TEST IF NO ERRORS HAD OCCURED DURING THE EXECUTION OF      * 07949000
                                        4623    *       AIDSYS05,OTHERWISE IT IS NOT NECESSARY TO CALL IT AGAIN    * 07959000
                                        4624    *       KNOWING THAT SOMETHING HAS OCCURED IN IT.                  * 07969000
                                        4625    *                                                                  * 07979000
                                        4626    ********************************************************************** 07989000
```

```
FLAG LOCTN OBJECT CODE     ADDR1  ADDR2  STMNT M  SOURCE STATEMENT                                                    
                                         4629    *                                                          08026000
000388 41 30 CE76          000E7C         4630          LA     R#03,TABGAFCT  LA CONVERSION TABLE FOR ERROR  08029000
00038C 47 F0 C3EE          0003F4         4631          B      ERRHANDL       GO TO DO THE CONVERSION         08039000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4632    ********************************************************************** 08059000
                                        4633    *                                                                    * 08069000
                                        4634    *       NOW THE DESCRIPTOR IS CREATED ,WE CAN THEN CALL AGAIN        * 08079000
                                        4635    *       AIDSYS05 IN ORDER TO GET OTHERS INFORMATION.                  * 08089000
                                        4636    *                                                                    * 08099000
                                        4637    ********************************************************************** 08109000


000390                                  4638    PREPARTN DS    0Y                                                    08129000
000390 41 10 C4F2     0004F8            4639             LA    R#01,WORKAREA      RESTORE REGISTER 1 IN ORDER TO COVER 08139000
                                        4640    *                                PARAMLISTR FOR SECOND CALL           08149000
000000                                  4641             USING SERVE,R#01                                            08159000
000394 92 4C 1011     000011            4642             MVI   ASAFCT,ASADS       ENVIRONMENT FUNCTION CALL            08169000
000398 96 04 1012     000012            4643             OI    ASASBFCT,ASADSCFN  SUBFUNCTION,WITH THE PARAMS          08179000
                                        4644    *                                FROM LAST CALL TO AIDSYS05           08189000
00039C 41 D0 C45E     000464            4645             LA    R#13,SAVE                                           08199000
0003A0 50 C0 C45E     000464            4646             ST    R#12,SAVE          SAVE BASE REGISTER                08209000


                                        4647    ********************************************************************** 08229000
                                        4648    *                                                                    * 08239000
                                        4649    *       THE PARAMETERS ARE READY FOR THE NEXT CALL.                  * 08249000
                                        4650    *                                                                    * 08259000
                                        4651    ********************************************************************** 08269000


0003A4 58 C0 C446     00044C            4652             L     R#12,=V(ADSERV)    AIDSYS05 HAS R12 AS BASE REGISTER  08289000
0003A8 05 EC                            4653             BALR  R#14,R#12          BUT DOES NOT LOAD IT               08299000
0003AA 58 CD 0000     000000            4654             L     R#12,0(R#13)       DON'T TOUCH AT THIS,THIS IS DANGER. 08309000

0003AE 58 80 C4EE     0004F4            4655             L     R#08,SAVEREG8      RESTORE A(CALLER PARAMETER LIST)   08312000

0003B2 91 30 8001     000001            4656             TM    DPARTN,DPAGAPRE    TEST IF AN ERROR HAS OCCURED WHEN  08315000
0003B6 47 10 C41C     000422            4657             BO    RTN                EXECUTING THE CALLER PAGE READ     08317000
                                        4658    *                                ROUTINE.THE FLAG IS YET SET.RETURN 08318000
```

```
AG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                      4659    ********************************************************************************* 08329000
                                      4660    *                                                                               * 08339000
                                      4661    *        TEST TO SEE IF NO ERRORT HAPPENED,IF THERE ARE SOME,THEN              * 08349000
                                      4662    *        GO TO THE ROUTINE FOR ERROR HANDLING.                                 * 08359000
                                      4663    *                                                                               * 08369000
                                      4664    ********************************************************************************* 08379000


0003BA 91 FF 1013      000013         4665            TM    ASARETRN,DPARTNT   TEST TO SEE IF NO PROBLEMS                    08399000
0003BE 47 80 C3C4      0003CA         4666            BZ    MOVERESU            NO PROBLEM,RETURN                            08409000

                                      4667    *                                                                               08416000
0003C2 41 30 CE76      000E7C         4668            LA    R#03,TABGAFCT      CONVERSION TABLE FOR ERROR HANDLING           08419000
0003C6 47 F0 C3EE      0003F4         4669            B     ERRHANDL           GOTO COMMON ROUTINE FOR ERROR                 08429000


0003CA                                4670    MOVERESU DS    0Y                                                               08449000
                                      4671    ********************************************************************************* 08459000
                                      4672    *                                                                               * 08469000
                                      4673    *        MOVE THE VALUES INTO THE EXPECTED ZONE                                * 08479000
                                      4674    *                                                                               * 08489000
                                      4675    ********************************************************************************* 08499000


0003CA 58 D0 C462      000468         4676            L     R#13,SAVE+4        RESTORE ADDRESS OF CALLER SAVEAREA            08519000
0003CE 58 8D 0018      000018         4677            L     R#08,24(R#13)      TO FIND THE ADDRESS OF CALLER PARAMS          08529000

0003D2 D2 07 8030105C  000030 00005C  4678            MVC   DPAGASEC,ASADSCSN  MOVE NAME OF CSECT MODULE                     08539000
                                      4679    *                                                                               08544000
0003D8 D2 03 80381064  000038 000064  4680            MVC   DPAGASTA,ASADSCSA  MOVE START ADDRESS OF CSECT                   08549000
                                      4681    *                                                                               08554000
0003DE D2 03 80401080  000040 000080  4682            MVC   DPAGACSL,ASADSCL   MOVE CSECT LENGTH                             08559000


0003E4 58 B0 802C      00002C         4683            L     R#11,DPAGAVA       ADDRESS GIVEN BY THE CALLER                   08569000
0003E8 5B B0 1064      000064         4684            S     R#11,ASADSCSA      SUBTRACT FROM ADDRESS GIVEN THE               08579000
                                      4685    *                                START ADDRESS OF THE CSECT FOUND              08589000
0003EC 50 B0 803C      00003C         4686            ST    R#11,DPAGAREL      PUT IT IN RETURN PARAMS                       08599000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4691    ********************************************************************************  08659000

    0003F0 47 F0 C41C     000422         4692            B      RTN                ALL IS O.K                                    08679000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4693    ********************************************************************************  08679600
                                         4694    *                                                                              *  08679900
                                         4695    *        THE FOLLOWING IS DONE IN ORDER TO TRANSLATE THE RETURN CODE           *  08680200
                                         4696    *        RETURNED BY THE AIDSYS05 INTO THE RETURN CODE EXPECTED BY             *  08680600
                                         4697    *        THE CALLER.THIS IS CALLED BY ALL FUNCTION WHICH CALLED                *  08680900
                                         4698    *        AIDSYS05.                                                             *  08681200
                                         4699    *                                                                              *  08681500
                                         4700    ********************************************************************************  08681900


                                                                                                                                   08682500
0003F4                                   4701    ERRHANDL DS    0Y                                                                 08682600
0003F4 17 22                             4702             XR    R#02,R#02          CLEAR REGISTER 2 BECAUSE OF THE AR              08682800
0003F6 43 20 1013       000013           4703             IC    R#02,ASARETRN      TRANSFER VALUE OF AIDSYS RETURN CODE            08683100
0003FA 88 20 0002       000002           4704             SRL   R#02,2            TO BE TRANSFORMED IN A DISPLACEMENT             08683500
0003FE 1A 32                             4705             AR    R#03,R#02          FIND THE CORRECT TRANSLATION VALUE              08683800
                                         4706    *                                                                                  08683900
000400 91 FF 3000                        4707             TM    0(R#03),DPARTNT    IF EQU FF THEN ERROR UNEXPECTED                 08684100
000404 47 10 C40C       000412           4708             BO    MODULERR                                                           08684400
                                         4709    *                                                                                  08684600
000408 D2 00 80013000 000001             4710             MVC   DPARTN(1),0(R#03)  MOVE THE CORRECTR VALUE FOR USER                08684800
                                         4711    *                                                                                  08684900
00040E 47 F0 C41C       000422           4712             B     RTN                                                                08685100
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4713   ********************************************************************************* 08685170
                                         4714   *                                                                               * 08685210
                                         4715   *       YOU ARE HERE ONLY IF THERE IS AN UNEXPECTED RETURN CODE                  * 08685250
                                         4716   *       FROM AIDSYS05.                                                          * 08685280
                                         4717   *                                                                               * 08685320
                                         4718   ********************************************************************************* 08685360


                                         4719   MODULERR DS    0Y                                                                08685400
000412                                   4720            MVI   DPARTN,DPAMODE     MOVE VALUE IN RETURN CODE ZONE                08685700
000412 92 08 8001         000001         4721            B     RTN                BRANCH TO COMMON EXIT                         08686000
000416 47 F0 C41C         000422
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         4722    ********************************************************************************  08686600
                                         4723    *                                                                              *  08686800
                                         4724    *        INPUT ADDRESS IN CONFLICT WITH FLAG,THAT WILL SAY THAT               *  08687100
                                         4725    *        THE GIVEN ADDRESS IS IN SYSTEM ZONE AND THE FLAG IS SET              *  08687300
                                         4726    *        TO USER ZONE OR IS IN USER ZONE AND THE FLAG IS SET TO               *  08687500
                                         4727    *        SYSTEM SPACE TO BE ACCESSED.THE SECOND CASE IS WHEN THE              *  08687800
                                         4728    *        CALLER SPECIFIES BOTH SYSTEM AND USER IS WANTED WHEN CALLING         *  08688000
                                         4729    *        THE GET ADDRESS FUNCTION.THE RETURN CODE IS X'  '.                   *  08688200
                                         4730    *                                                                              *  08688500
                                         4731    ********************************************************************************  08688700


  00041A                                 4732    RTNAIC   DS    0Y                                                                08688770
  00041A 92 2C 8001       000001         4733            MVI   DPAGARTN,DPAGAIAF  MOVE VALUE IN RETURN CODE ZONE                 08688800
  00041E 47 F0 C41C       000422         4734            B     RTN                RETURN TO THE CALLER                            08688850
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT

                                        4735    ********************************************************************************  08699000
                                        4736    *                                                                              *  08709000
                                        4737    *        HERE IS THE ONLY ONE POINT WHERE YOU CAN GET OUT OF                   *  08719000
                                        4738    *        ALL THE MODULE.                                                       *  08729000
                                        4739    *                                                                              *  08739000
                                        4740    ********************************************************************************  08749000



000422                                  4741    RTN      DS     0Y                                                                 08769000
000422 58 D0 C462     000468            4742             L      R#13,SAVE+4          RESTORE REGISTERS OF CALLING PGM              08779000
000426 98 EC D00C                       4743             LM     R#14,R#12,12(R#13)                                                 08789000
00042A 07 FE                            4744             BR     R#14                                                               08799000
                                        4745             LTORG                                                                     08809000
000430 00000000                         4746                    =A(0)
000434 00000000                         4747                    =F'0'
000438 00000E90                         4748                    =A(MYDYNDTA)
00043C 00000CC8                         4749                    =A(WORKAREA+2000)
000440 000022F0                         4750                    =A(WRKETPND)
000444 00001BF0                         4751                    =A(MYSTATDT)
000448 000008F8                         4752                    =A(WORKAREA+1024)
00044C 00000000                         4753                    =V(ADSERV)
000450 C1C9C4E2E8E2                     4754                    =C'AIDSYS'
```

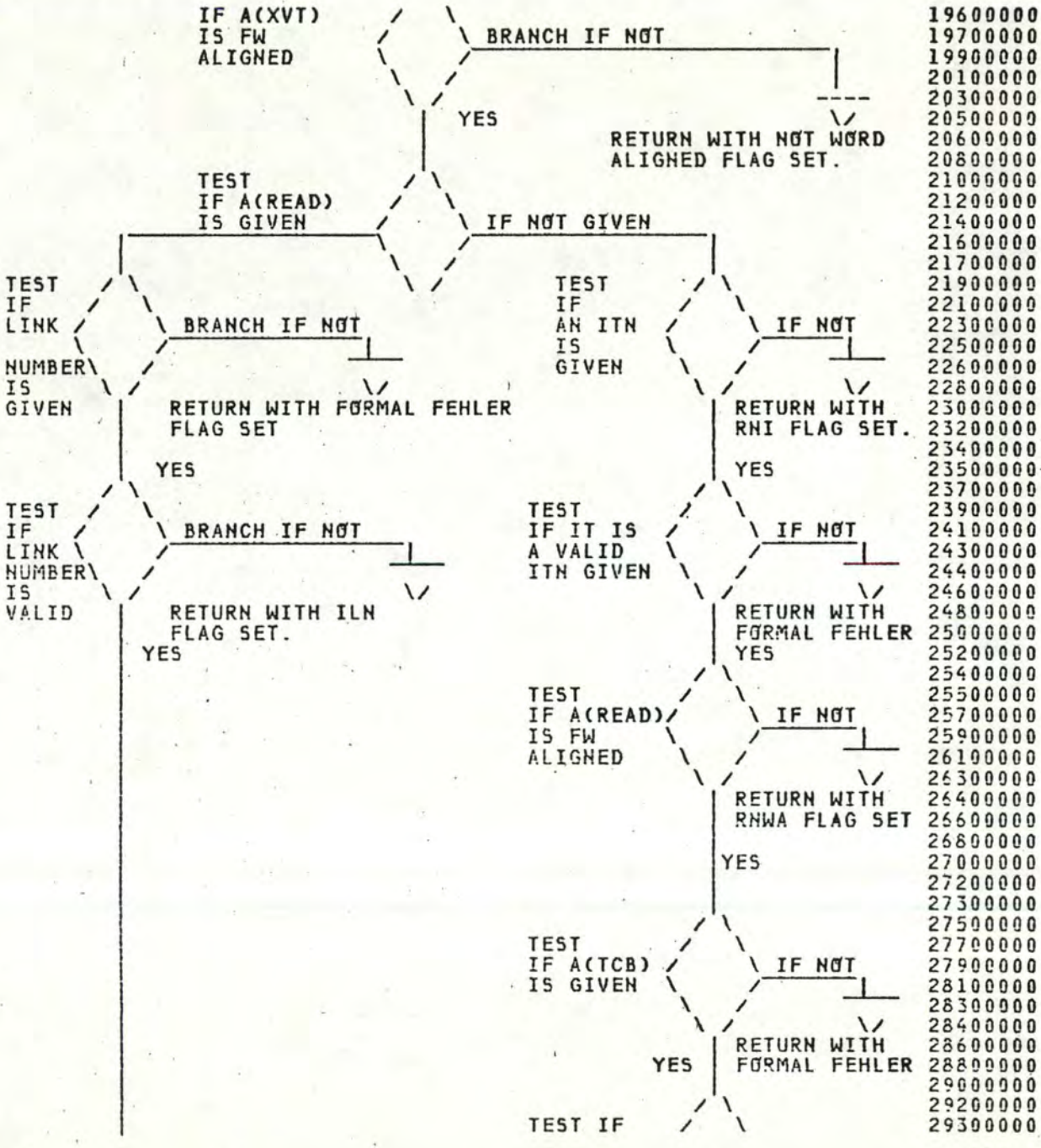
```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
    000458 00000000                      4755    SYSBASE  DC     A(0)              SIMULATION OF SYSTEM START ADDRESS   08820000
    00045C 00000000                      4756    AREADRT  DC     A(0)              A(CALLER DUMPFILE READ ROUTINE)      08821000
    000460 00000000                      4757    EXVTBASE DC     A(0)            A(XVT)                                 08822000


                                         4758    *AVE1    DS     18F             SAVEAREA WHEN CALLING AIDSYS02       08829000
    000464                               4759    SAVE     DS     18F             SAVEAREA WHEN CALLING AIDSYS05       08839000
    0004AC                               4760    SAVE3    DS     18F             SAVEAREA USED TO SAVE REGISTERS      08844000
                                         4761    *                              WHEN CALLING AS4RDPGE                08846000
    0004F4                               4762    SAVEREG8 DS     F               SAVE IF TWO CALL TO AS4ITNDP !!      08847000
    0004F8                               4763    WORKAREA DS     600F            COVERING PARAMETER.LIST,A(RET) STACK 08849000
    000E58                               4764    TAB      DS     4F              THIS TABLE CONTAINS THE MINIMAL      08859000
                      000E58             4765             ORG    TAB             VALUE OF BUFFER LENGTH               08869000
    000E58 00000021                      4766    CMLEN    DC     F'33'           MINIMAL VALUE FOR CMFCT              08879000
    000E5C 00000014                      4767    GALEN    DC     F'20'           MINIMAL VALUE FOR GAFCT              08889000
                                         4768    *        DC     F'0'            NO MORE USED WAS USED FOR CRFCT      08899000
    000E60 00000013                      4769    PULEN    DC     F'19'           MINIMAL VALUE FOR PUFCT(+CRFCT)      08909000


                                         4770    *LAGUS   DS     X               NO MORE USED                         08919000
                                         4771    *ABALPHA DS     XL41            NO MORE USED WAS USED ONLY TO FIND   08929000
                                         4772    *        ORG    TABALPHA        IF THE FIRST CARACTER OF THE FILE    08939000
                                         4773    *        DC     X'AABBCCDDEEFFF0F1F200000000000000' NAME GIVEN WHEN  08949000
                                         4774    *        DC     X'F3F4F5F6F7F8F9FAFB00000000000000' THE CALLER HAD TO 08959000
                                         4775    *        DC     X'00FCFDFEFFAABBCCDD'  TO GIVE US A A(FCB) WAS CORRECT 08969000


    000E64 0000                          4776    ASUB     DC     H'0'                FIELD COVER TWO DISTINCT THINGS:  08979000
                                         4777    *                          1.IF THE CALLER SPECIFIES BOTH DOMAIN.    08984000
                                         4778    *                          2.MANAGERING THE TRANSFORMATION OF FLAG   08986000


    000E68                               4779    TABCMFCT DS     0F       RETURN CODE TRANSLATION FOR CMFCT            08989000
    000E68 000428FFFF382C48              4780             DC     X'000428FFFF382C4810FF1444184CFFFFFF3C50'            08999000


    000E7C                               4781    TABGAFCT DS     0F       RETURN CODE TRANSLATION FOR GAFCT            09009000
    000E7C 0004FF28FF38FFFF              4782             DC     X'0004FF28FF38FFFF102C1434183CFFFFFFFF40'            09019000


    000E90                               4783    MYDYNDTA DS     0F       SPACE RESERVED FOR COVERING DYNDATA          09049000
                      001BF0             4784             ORG    *+DYNLEN                                             09059000
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
   0022F0                                4787    WRKETPND DS     0F                                                  09085000
                         0227F0         4788             ORG    *+X'20500'                                          09086000


                         000422         4789    RTNISFN  EQU    RTN                                                 09089000
                         000422         4790    PEFCT    EQU    RTN                                                 09109000
                                        4791             ETPND  DPACCESS,VER=800,DATE=850131,PATCH=200,LTORG=NO      09119000
                                        4792  1          PRINT ON,GEN
                                        4793  1 *  THIS MACRO IS USED TO GIVE THE STANDARD TERMINATE FOR A MODULE
                                        4794  1 *   N           MANDATORY POSITIONAL OPERAND 1 - MODULE NAME
                                        4795  1 *   B           OPTIONAL  POSITIONAL OPERAND 2 - LENGTH OF MODULE
                                        4796  1 *   PATCH=      OPTIONAL  OPERAND - LENGTH OF PATCHAREA
                                        4797  1 *                                   (ZERO MAY BE SPECIFIED)
                                        4798  1 *                                   DEFAULT - 200 BYTES
                                        4799  1 *                                   IF B AND &PATCH PARAMS NOT USED
                                        4800  1 *   DATE=       OPTIONAL  OPERAND - DATE (FORMAT YYMMDD)
                                        4801  1 *   VER=        MANDATORY OPERAND - MODULE VERSION NUMBER  (3 DIGITS)
                                        4802  1 *   COMPNR=     OPTIONAL  OPERAND - TO IDENTIFY COMPONENT NUMBER
                                        4803  1 *   CSECT=      OPTIONAL OPERAND
                                        4804  1 *               YES (DEFAULT)          ORIGINAL CSECT FOR ETPND
                                        4805  1 *               NO                     NO CSECT IS CREATED
                                        4806  1 *               NAME                   SPECIAL CSECT NAME
                                        4807  1 *   LTORG=      OPTIONAL  OPERAND - DEFAULT=YES. NO=NOT IN EXPANSION
                         0227F0         4808  1          ORG
0227F0 00                               4809  1          DC     200X'00'
0228B8                                  4810  1          DS     0D
0228B8 C4D7C1C3C3C5E2E2                 4811  1          DC     CL8'DPACCESS'              MODULE NAME
0228C0 F8F0F0                           4812  1          DC     CL3'800'                MODULE VERSION NUMBER ASSIGNED
0228C3 C7                               4813  1          DC     CL1'G'                MACRO LIBRARY VERSION
0228C4 F8F5F0F1F3F1                     4814  1          DC     CL6'850131'              ASSEMBLY SUBMISSION DATE
0228CA F3F4F8                           4815  1          DC     CL3'348'               CURRENT JULIAN ASSEMBLY DATE
0228CD 000000                           4816  1          DC     AL3(DPACCESS)              LOAD ADDRESS OF MODULE
```

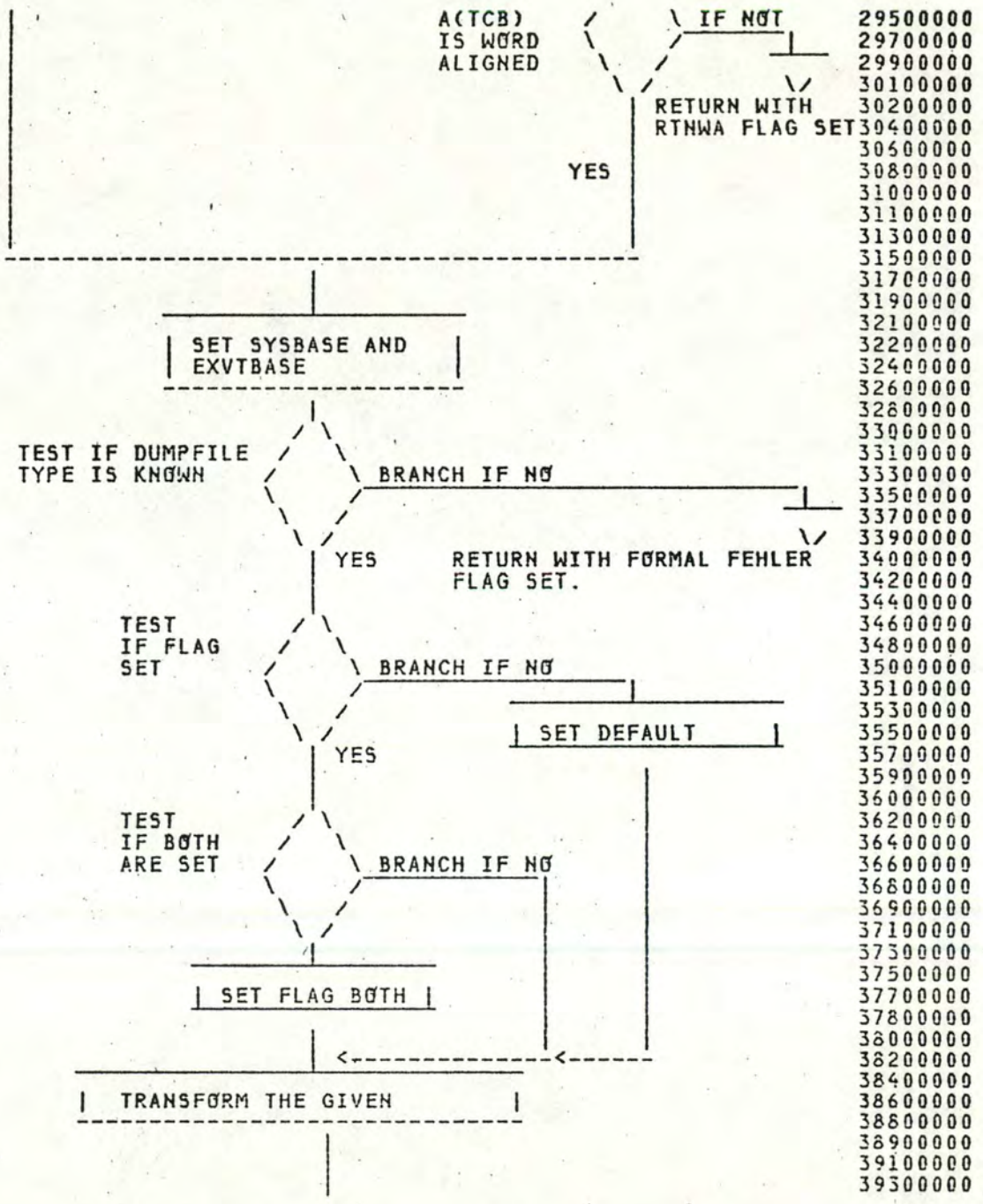
```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4817    ********************************************************************** 09132000
                                        4818    *                                                                    * 09136000
                                        4819    *        WHAT IS DESCRIBED NOW IS THE TRANSLATION TABLES FOR         * 09140000
                                        4820    *        CHANGING THE RETURN CODE RETURNED BY ADSERV IN RETURN       * 09144000
                                        4821    *        CODE EXPECTED BY THE USER.                                  * 09148000
                                        4822    *                                                                    * 09152000
                                        4823    ********************************************************************** 09155000


                                        4824    ********************************************************************** 09163000
                                        4825    *                                                                    * 09167000
                                        4826    *  VALUE OF R.C.  *  VALUE OF R.C.  *  VALUE OF R.C.  * SIGNIFICATION * 09171000
                                        4827    *  FROM ADSERV    *  FROM ADSERV    *  FROM ADSERV    * OF R.C.       * 09175000
                                        4828    *                 *  TO CMFCT       *  TO GAFCT       *                * 09179000
                                        4829    ********************************************************************** 09182000
                                        4830    *       00        *       00        *       00        * NO ERROR      * 09186000
                                        4831    *                 *                 *                 *              * 09190000
                                        4832    *       04        *       04        *       04        * FORMAL FEHLER * 09194000
                                        4833    *                 *                 *                 *              * 09198000
                                        4834    *       08        *       28        *      ERROR      * BUFFER OVFLW  * 09202000
                                        4835    *                 *                 *                 *              * 09206000
                                        4836    *       0C        *      ERROR      *       28        * ADDRESS UNALOC* 09206070
                                        4837    *                 *                 *                 *              * 09206150
                                        4838    *       10        *      ERROR      *      ERROR      * UNEXPECTED    * 09206230
                                        4839    *                 *                 *                 *              * 09206310
                                        4840    *       14        *       38        *       38        * NO PGM LOADED * 09206390
                                        4841    *                 *                 *                 *              * 09206470
                                        4842    *       18        *       2C        *      ERROR      * BUFFER UNACC  * 09206540
                                        4843    *                 *                 *                 *              * 09206620
                                        4844    *       1C        *       48        *      ERROR      * OLDFMT LOADINF* 09206700
                                        4845    *                 *                 *                 *              * 09206780
                                        4846    *       20        *       10        *       10        * FILE NOT OPEN * 09206860
                                        4847    *                 *                 *                 *              * 09206940
                                        4848    *       24        *      ERROR      *       2C        * ADDRESS<>FLAG * 09207010
                                        4849    *                 *                 *                 *              * 09207090
                                        4850    *       28        *       14        *       14        * SPECIF TASK NF* 09207170
                                        4851    *                 *                 *                 *              * 09207250
                                        4852    *       2C        *       44        *       34        * SYSTEM ERROR  * 09207330
                                        4853    *                 *                 *                 *              * 09207410
                                        4854    *       30        *       18        *       18        * TASK SPEC NEC * 09207480
                                        4855    *                 *                 *                 *              * 09207560
                                        4856    *       34        *       4C        *      ERROR      * INFO NOT IN DF* 09207640
                                        4857    *                 *                 *                 *              * 09207720
                                        4858    *       38        *      ERROR      *      ERROR      * UNEXPECTED    * 09207800
                                        4859    *                 *                 *                 *              * 09207880
                                        4860    *       3C        *      ERROR      *      ERROR      * UNEXPECTED    * 09207960
                                        4861    *                 *                 *                 *              * 09208050
                                        4862    *       40        *      ERROR      *      ERROR      * UNEXPECTED    * 09208140
                                        4863    *                 *                 *                 *              * 09208230
                                        4864    *       44        *       3C        *      ERROR      * NO CSECT FOUND* 09208320
                                        4865    *                 *                 *                 *              * 09208400
                                        4866    *       48        *       50        *       40        * PAGE NOT DUMPD* 09208490
                                        4867    *                 *                 *                 *              * 09208580
                                        4868    *                 *                 *                 *              * 09208670
                                        4869    ********************************************************************** 09208760
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4870    ********************************************************************************  09600000
                                        4871    *                                                                              *  09800000
                                        4872    *       THE NEXT PART IS SET IN COMMENTS AND DESCRIBE THE FLOW CHART           *  10000000
                                        4873    *       OF ALL THE PARTS OF THE MODULE.ALL LOGICAL PART WILL HAVE              *  10100000
                                        4874    *       IT'S OWN DESCRIPTION IN ONE SHEET OF PAPER.                            *  10300000
                                        4875    *                                                                              *  10500000
                                        4876    ********************************************************************************  10700000
                                        4877    *                    ---------------------------                               10900000
                                        4878    *                    | SAVE CALLERS REGISTERS |                               11100000
                                        4879    *                    ---------------------------                               11300000
                                        4880    *                                 |                                            11400000
                                        4881    *                                 |                                            11600000
                                        4882    *                    ---------------------------                               11800000
                                        4883    *                    | PREPARE SAVE AREA       |                               12000000
                                        4884    *                    | AND COVER PARAM LIST    |                               12100000
                                        4885    *                    ---------------------------                               12300000
                                        4886    *                                 |                                            12500000
                                        4887    *                                / \                                           12700000
                                        4888    *                  TEST         /   \                                         12900000
                                        4889    *                  IF VALID    /     \  BRANCH IF NO                         13000000
                                        4890    *                  FUNCTION    \     /  ------------------------------------  13200000
                                        4891    *                  NUMBER       \   /                                        13400000
                                        4892    *                                \ /                                         13600000
                                        4893    *                                 |                                    ----   13800000
                                        4894    *                                 | YES                                \/     13900000
                                        4895    *                                 |                RETURN WITH INVALID FUNCTION  14100000
                                        4896    *                                 |                NUMBER FLAG SET.              14300000
                                        4897    *                                / \                  FLAG SET.               14500000
                                        4898    *                  TEST IF      /   \                                         14700000
                                        4899    *                  A(SYSBASE)  /     \ BRANCH IF NO                         14900000
                                        4900    *                  IS GIVEN    \     /  ------------------------------------  15000000
                                        4901    *                               \   /                                        15200000
                                        4902    *                                \ /                                         15400000
                                        4903    *                                 |                                    \/     15600000
                                        4904    *                                 | YES                RETURN WITH FORMAL FEHLER 15800000
                                        4905    *                                 |                FLAG SET.                 15900000
                                        4906    *                                / \                                         16100000
                                        4907    *                    TEST IF    /   \                                        16300000
                                        4908    *                    A(SYSBASE) /     \ BRANCH IF NO                        16500000
                                        4909    *                    IS FW      \     /  ------------------------------------  16700000
                                        4910    *                    ALIGNED     \   /                                   ----   16800000
                                        4911    *                                \ /                                    \/     17000000
                                        4912    *                                 |                                           17200000
                                        4913    *                                 | YES                                       17400000
                                        4914    *                                 |                RETURN WITH NOT WORD       17600000
                                        4915    *                                 |                ALIGNED FLAG SET.          17700000
                                        4916    *                                / \                                         17900000
                                        4917    *                    TEST IF    /   \                                        18100000
                                        4918    *                    IF A(XVT)  /     \ BRANCH IF NO                        18300000
                                        4919    *                    IS GIVEN   \     /  ------------------------------------  18500000
                                        4920    *                                \   /                                   ----   18700000
                                        4921    *                                 \ /                                    \/     18800000
                                        4922    *                                 |                RETURN WITH INVALID FCB    19000000
                                        4923    *                                 |                ERROR FLAG SET.            19200000
                                        4924    *                  TEST          / \                                         19400000
```

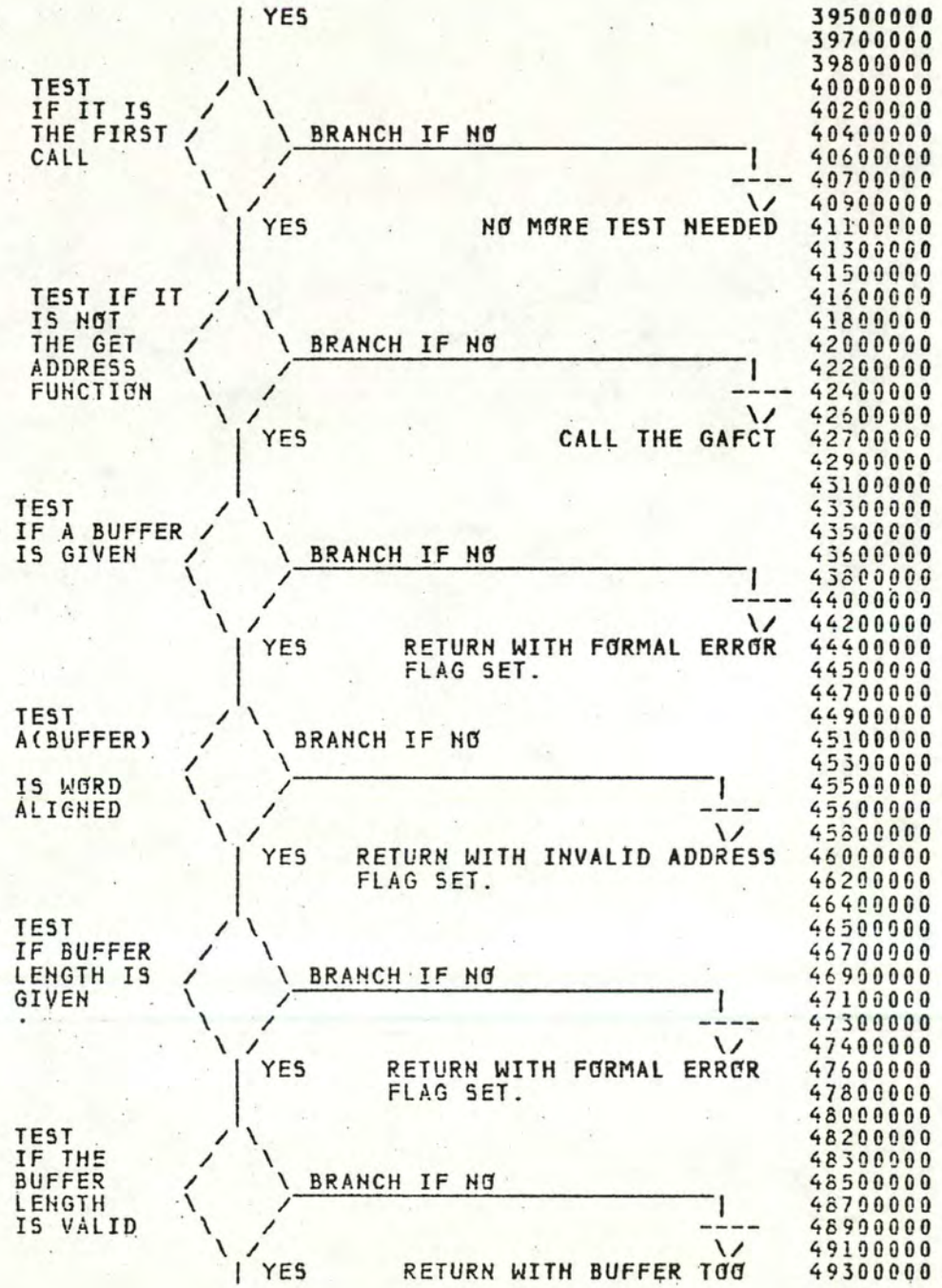
```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
```



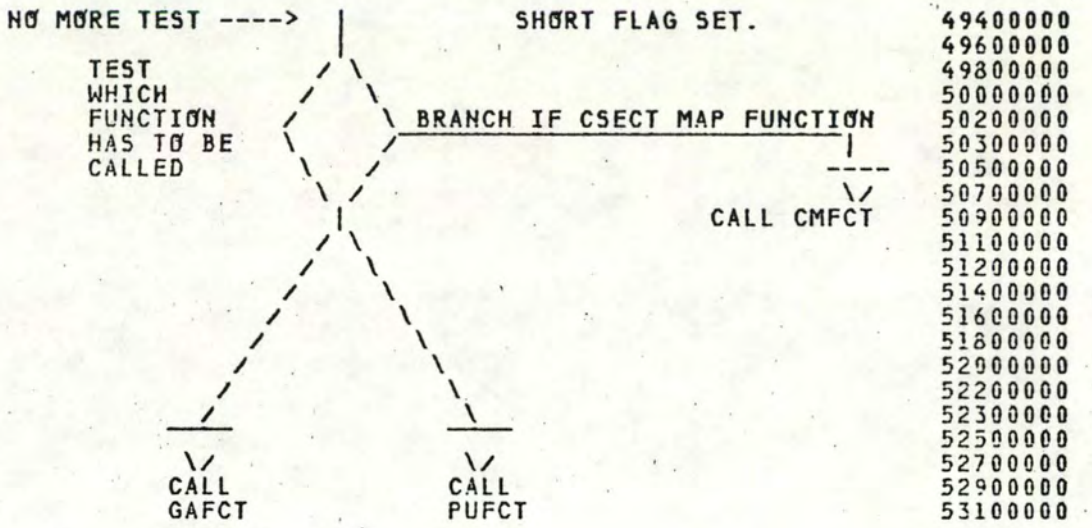
```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        4980    *                                                    29500000
                                        4981    *                                                    29700000
                                        4982    *                                                    29900000
                                        4983    *                                                    30100000
                                        4984    *                                                    30200000
                                        4985    *                                                    30400000
                                        4986    *                                                    30600000
                                        4987    *                                                    30800000
                                        4988    *                                                    31000000
                                        4989    *                                                    31100000
                                        4990    *                                                    31300000
                                        4991    *                                                    31500000
                                        4992    *                                                    31700000
                                        4993    *                                                    31900000
                                        4994    *                                                    32100000
                                        4995    *                                                    32200000
                                        4996    *                                                    32400000
                                        4997    *                                                    32600000
                                        4998    *                                                    32800000
                                        4999    *                                                    33000000
                                        5000    *                                                    33100000
                                        5001    *                                                    33300000
                                        5002    *                                                    33500000
                                        5003    *                                                    33700000
                                        5004    *                                                    33900000
                                        5005    *                                                    34000000
                                        5006    *                                                    34200000
                                        5007    *                                                    34400000
                                        5008    *                                                    34600000
                                        5009    *                                                    34800000
                                        5010    *                                                    35000000
                                        5011    *                                                    35100000
                                        5012    *                                                    35300000
                                        5013    *                                                    35500000
                                        5014    *                                                    35700000
                                        5015    *                                                    35900000
                                        5016    *                                                    36000000
                                        5017    *                                                    36200000
                                        5018    *                                                    36400000
                                        5019    *                                                    36600000
                                        5020    *                                                    36800000
                                        5021    *                                                    36900000
                                        5022    *                                                    37100000
                                        5023    *                                                    37300000
                                        5024    *                                                    37500000
                                        5025    *                                                    37700000
                                        5026    *                                                    37800000
                                        5027    *                                                    38000000
                                        5028    *                                                    38200000
                                        5029    *                                                    38400000
                                        5030    *                                                    38600000
                                        5031    *                                                    38800000
                                        5032    *                                                    38900000
                                        5033    *                                                    39100000
                                        5034    *                                                    39300000
```



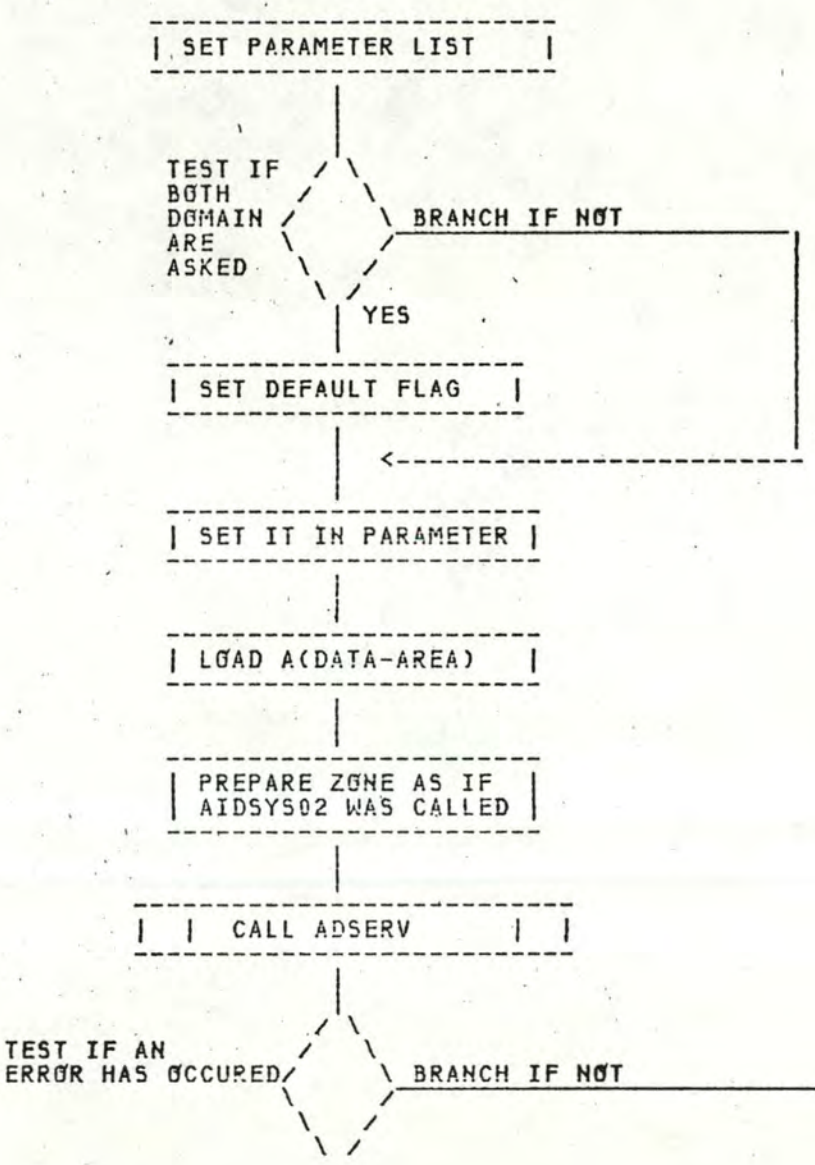
```
FLAG LOCTN OBJECT CODE   ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                5035    *                                                                    39500000
                                5036    *                                                                    39700000
                                5037    *                                                                    39800000
                                5038    *                                                                    40000000
                                5039    *                                                                    40200000
                                5040    *                                                                    40400000
                                5041    *                                                                    40600000
                                5042    *                                                                    40700000
                                5043    *                                                                    40900000
                                5044    *                                                                    41100000
                                5045    *                                                                    41300000
                                5046    *                                                                    41500000
                                5047    *                                                                    41600000
                                5048    *                                                                    41800000
                                5049    *                                                                    42000000
                                5050    *                                                                    42200000
                                5051    *                                                                    42400000
                                5052    *                                                                    42600000
                                5053    *                                                                    42700000
                                5054    *                                                                    42900000
                                5055    *                                                                    43100000
                                5056    *                                                                    43300000
                                5057    *                                                                    43500000
                                5058    *                                                                    43600000
                                5059    *                                                                    43800000
                                5060    *                                                                    44000000
                                5061    *                                                                    44200000
                                5062    *                                                                    44400000
                                5063    *                                                                    44500000
                                5064    *                                                                    44700000
                                5065    *                                                                    44900000
                                5066    *                                                                    45100000
                                5067    *                                                                    45300000
                                5068    *                                                                    45500000
                                5069    *                                                                    45600000
                                5070    *                                                                    45800000
                                5071    *                                                                    46000000
                                5072    *                                                                    46200000
                                5073    *                                                                    46400000
                                5074    *                                                                    46500000
                                5075    *                                                                    46700000
                                5076    *                                                                    46900000
                                5077    *                                                                    47100000
                                5078    *                                                                    47300000
                                5079    *                                                                    47400000
                                5080    *                                                                    47600000
                                5081    *                                                                    47800000
                                5082    *                                                                    48000000
                                5083    *                                                                    48200000
                                5084    *                                                                    48300000
                                5085    *                                                                    48500000
                                5086    *                                                                    48700000
                                5087    *                                                                    48900000
                                5088    *                                                                    49100000
                                5089    *                                                                    49300000
```



```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                          5090    *                                                    49400000
                                          5091    *                                                    49600000
                                          5092    *                                                    49800000
                                          5093    *                                                    50000000
                                          5094    *                                                    50200000
                                          5095    *                                                    50300000
                                          5096    *                                                    50500000
                                          5097    *                                                    50700000
                                          5098    *                                                    50900000
                                          5099    *                                                    51100000
                                          5100    *                                                    51200000
                                          5101    *                                                    51400000
                                          5102    *                                                    51600000
                                          5103    *                                                    51800000
                                          5104    *                                                    52000000
                                          5105    *                                                    52200000
                                          5106    *                                                    52300000
                                          5107    *                                                    52500000
                                          5108    *                                                    52700000
                                          5109    *                                                    52900000
                                          5110    *                                                    53100000
```

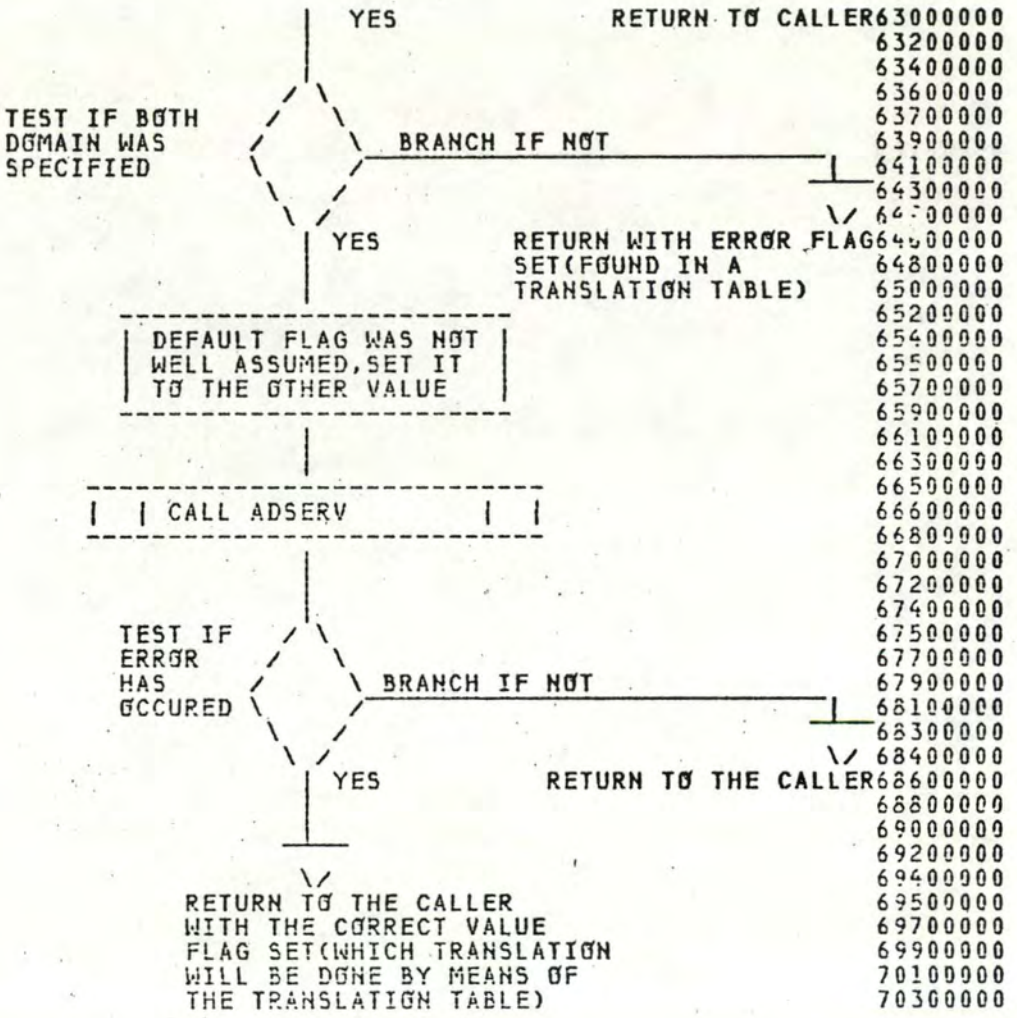


```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        5111    ********************************************************************************* 53400000
                                        5112    *                                                                               * 53600000
                                        5113    *          THE NEXT FLOWCHART IS THE FLOW OF CMFCT                              * 53800000
                                        5114    *                                                                               * 54000000
                                        5115    *********************************************************************************54100000
```



FLAG LOCTN OBJECT CODE ADDR1 ADDR2 STMNT M SOURCE STATEMENT

```
                                    5163     *
                                    5164     *
                                    5165     *
                                    5166     *
                                    5167     *
                                    5168     *
                                    5169     *
                                    5170     *
                                    5171     *
                                    5172     *
                                    5173     *
                                    5174     *
                                    5175     *
                                    5176     *
                                    5177     *
                                    5178     *
                                    5179     *
                                    5180     *
                                    5181     *
                                    5182     *
                                    5183     *
                                    5184     *
                                    5185     *
                                    5186     *
                                    5187     *
                                    5188     *
                                    5189     *
                                    5190     *
                                    5191     *
                                    5192     *
                                    5193     *
                                    5194     *
                                    5195     *
                                    5196     *
                                    5197     *
                                    5198     *
                                    5199     *
                                    5200     *
                                    5201     *
                                    5202     *
                                    5203     *
```



```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                        5204    ********************************************************************************
                                        5205    *                                                                              *
                                        5206    *        THE NEXT IS THE FLOWCHART FOR THE GAFCT.                              *
                                        5207    *                                                                              *
                                        5208    ********************************************************************************
                                        5209    *
                                        5210    *                          ---------------------
                                        5211    *                          | SET PARAMETER LIST |
                                        5212    *                          ---------------------
                                        5213    *                                     |
                                        5214    *                                    / \
                                        5215    *  TEST IF BOTH                     /   \
                                        5216    *  DOMAIN FLAG                      \   / BRANCH IF NOT ------------------|
                                        5217    *  IS RESET                          \ /                                   |
                                        5218    *                                     |                                    |
                                        5219    *                                     |                                    \/
                                        5220    *                                     | YES          RETURN WITH ADDRESS
                                        5221    *                                     |              IN CONFLICT FLAG SET
                                        5222    *                                     |
                                        5223    *                          ---------------------
                                        5224    *                          | MOVE CORRECT FLAG |
                                        5225    *                          ---------------------
                                        5226    *                                     |
                                        5227    *                          ---------------------
                                        5228    *                          | LOAD A(DATA-AREA) |
                                        5229    *                          ---------------------
                                        5230    *                                     |
                                        5231    *                          ---------------------
                                        5232    *                          | SET FIELD AS IF IT|
                                        5233    *                          | THE CALL TO AIDSYS|
                                        5234    *                          | 02 WAS DONE.      |
                                        5235    *                          ---------------------
                                        5236    *                                     |
                                        5237    *                     ---------------------------
                                        5238    *                     |   | CALL ADSERV     |   |
                                        5239    *                     ---------------------------
                                        5240    *                                     |
                                        5241    *                                    / \
                                        5242    *  TEST IF NO ERROR                 /   \
                                        5243    *  HAS OCCURED                      \   / BRANCH IF NO ------------------|
                                        5244    *  IN ADSERV                         \ /                                   |
                                        5245    *                                     |                                    |
                                        5246    *                                     |                                    \/
                                        5247    *                                     | YES          RETURN WITH THE CORRECT
                                        5248    *                                     |              FLAG SET(FOUND IN THE
                                        5249    *                                     |              TRANSLATION TABLE).
                                        5250    *
                                        5251    *
                                        5252    *
                                        5253    *
```

```
FLAG LOCTN OBJECT CODE    ADDR1  ADDR2  STMNT M  SOURCE STATEMENT
                                         5254    *                                                                  79900000
                                         5255    *                  ---------------------                           80000000
                                         5256    *                  | UPDATE PARAMETER  |                           80200000
                                         5257    *                  | LIST              |                           80400000
                                         5258    *                  ---------------------                           80600000
                                         5259    *                            |                                     80800000
                                         5260    *                  -------------------------                       80900000
                                         5261    *                  |  | CALL ADSERV      |  |                       81100000
                                         5262    *                  -------------------------                       81300000
                                         5263    *                            |                                     81500000
                                         5264    *                            |                                     81700000
                                         5265    *                            |                                     81800000
                                         5266    *  TEST IF NO ERROR         / \                                     82000000
                                         5267    *  HAS OCCURED             /   \                                    82200000
                                         5268    *  IN ADSERV              /     \  BRANCH IF NOT ------------------| 82400000
                                         5269    *                         \     /                                  |  82600000
                                         5270    *                          \   /                                   |  82700000
                                         5271    *                           \ /                                    \/ 82900000
                                         5272    *                            |  YES      RETURN WITH ERROR FLAG      83100000
                                         5273    *                            |           SET WITH CORRESPONDING      83300000
                                         5274    *                            |           VALUE(FOUND IN THE          83500000
                                         5275    *                  ---------------------  TRANSLATION TABLE)      83700000
                                         5276    *                  | MOVE RESULTS IN   |                           83800000
                                         5277    *                  | USER PARAM LIST   |                           84000000
                                         5278    *                  ---------------------                           84200000
                                         5279    *                            |                                     84400000
                                         5280    *                            |                                     84600000
                                         5281    *                          -----                                   84700000
                                         5282    *                           \ /                                    84900000
                                         5283    *  RETURN TO THE CALLER                                             85100000
                                         5284    *                                                                   85300000
```